A Guide to Site Identification and Interpretation for the Kamloops Forest Region

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February 1990

BC
Ministry of Forests

90-07007/

Canadian Cataloguing in Publication Data

Main entry under title:
A Guide to site identification and interpretation for
the Kamloops Forest Region

(Land management handbook, ISSN 0229-1622 ; no. 23)

Field guide format in two parts.
Also issued in an office-size format.
Includes bibliographical references.
ISBN 0-7718-8921-6

1. Bioclimatology - British Columbia. 2. Biogeography - British Columbia. 3. Forest site quality - British Columbia. 4. Forest ecology - British Columbia. 5. Forest management - British Columbia. 6. Kamloops Forest Region (B.C.) I. Lloyd, D., 1950- . II. British Columbia. Ministry of Forests. III. Series.

QH541.5.F6G84 1990 581.5'2642'09711 C90-092070-X

© 1990 Province of British Columbia
Published by the
Research Branch
Ministry of Forests
31 Bastion Square
Victoria, B.C. V8W 3E7

Copies of this and other Ministry of Forests titles are available from Crown Publications Inc., 546 Yates Street, Victoria, B.C. V8W 1K8.

ACKNOWLEDGEMENTS

Ecological classification of the Kamloops Forest Region was initiated by Bob Mitchell and Karel Klinka in 1976. Since then, many people have been involved in the data collection, data analysis, correlation and report preparation phases of this project. The authors are particularly indebted to Barb Zimonick, Mike Rimmer, and Helen Lee for their patience and dedication during the report preparation phase.

The data collection phase was managed by Bob Mitchell. Sampling and data entry were completed by Bryce Bancroft, Dan Balmos, Stephen Bloom, Gordon Butt, Rita Eremko, Wayne Erickson, Ed Hughes, Andy Jakoy, Jean Mather, Bob Mitchell, Cheryl Ray, Bruce Roddin, Fraser Russell, Angela Scholten, Suzanne Simard, Bela Sivak, and Dave Walkem. Vascular plants, bryophytes and lichens were identified or verified by Frank Boas, Adolf Ceska, George Douglas, Trevor Goward, and Terry McIntosh. We thank Alastair McLean, Tom Lester, Chris Brayshaw, Mark Bell, and Trevor Goward for the use of their field data. The Ministry of Environment and the Nelson Forest Region's Research Section also provided data.

The classification has benefited from our discussions with Bob Mitchell, Bob Green, Gordon Butt, Bryce Bancroft, Wayne Erickson, Suzanne Simard and Norma Stromberg, who provided insight, experience and preliminary classification. Barb Zimonick completed most of the data processing and some of the word processing for this guide. Ecological program staff from other forest regions have shared their knowledge and participated in many valuable discussions.

Del Meidinger has provided technical advice and leadership in co-ordinating the province-wide correlation program. Assistance was provided by Carol Jones, Carmen Cadrin, Karen Yearsley, Shirley Mah, and Tracy Fleming.

The interpretation section has benefitted from the contributions made by Bernie Ivanco, Ron Newman, Rick Tucker, Hadrian Merler, Lorraine MacLauchlin, Gerry Still, and Scott Lindeburgh.

Del Meidinger, Andy MacKinnon, Ted Lea, Bryce Bancroft, Cindy Pearse, Shirley Mah, Tom Braumandl, Georgina Montgomery and Frances Bishop reviewed the manuscript and provided valuable comments and useful criticisms.

We thank the staff of Bishop and Rimmer Media Services Ltd. for their professional help and creative solutions in preparing this document for publication, as well as Brenda MacKenzie and Donn Tarris of QuickSet Graphics for their patience and assistance in imagesetting the camera-ready copy.

Funding was provided by the Ministry of Forests. We appreciate the support provided by Ted Baker, Phil Van Mol, Jack Robinson and Yo Yano.

There are obviously others who provided advice or logistical support, to whom we extend our thanks.

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1 INTRODUCTION

Growing public awareness and increased demands on the resource base necessitate sound forest management. The Kamloops Forest Region (KFR) shown in Figure 1, has a wide variety of climates, soils, vegetation and topography. This results in a large number of diverse ecosystems, each requiring its own management strategy. The ecosystem classification presented in this guide provides a mechanism to divide this complex landscape into ecologically meaningful management units. Ecosystem classification is fundamental to achieving integrated resource management. It provides a framework for organizing our knowledge about ecosystems and a common denominator for developing, comparing and communicating management strategies.

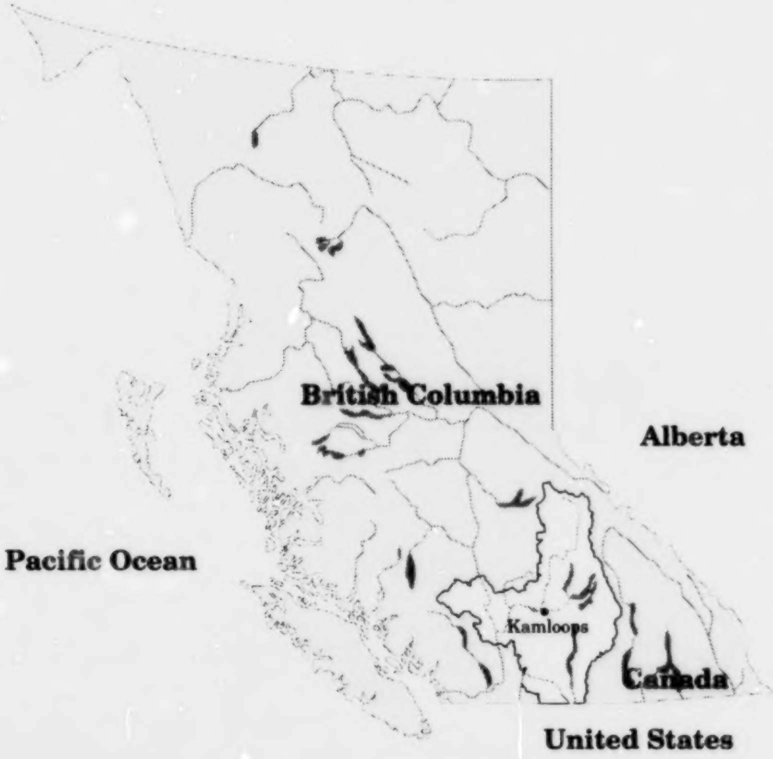


FIGURE 1. Location map of the Kamloops Forest Region.

The biogeoclimatic classification system developed by Dr. V.J. Krajina and his students was adopted by the B.C. Ministry of Forests in the mid-1970s because its hierarchical structure makes it well suited for provincial, regional and site-specific interpretations. It incorporates both biotic and environmental factors, and is therefore applicable to many resource uses. The system has been modified and expanded by Ministry of Forests staff during the past 10 years and renamed the Biogeoclimatic Ecosystem Classification, (BEC). It has also been coined the "Ecosystems" approach to resource management. A comprehensive review of BEC has recently been published (Pojar *et al.* 1987).

The biogeoclimatic ecosystem classification presented for the KFR represents a second approximation. It incorporates the results of Mitchell and Green (1981), Lloyd (1984), and Erickson and Lloyd (1985), as well as the current results of the provincial correlation program. Some previously identified biogeoclimatic units have been combined or divided, nomenclature has been simplified, and the identification aids have been improved.

This classification is not "etched in stone", it merely reflects the state of our current knowledge and level of sampling. Future sampling, further testing of the classification, and provincial correlation will produce changes. We acknowledge deficiencies in the sampling of the driest and/or wettest ecosystems of some biogeoclimatic units. Restricted road access in Wells Gray Park, the Okanagan Range, and the immediate eastern slopes of the Coast Range has resulted in a reduced sampling intensity. Consequently, we have less confidence in the mapping and classification of these areas.

The field guide has eight sections. The introduction is followed by a summary of the concepts, principles, and structure of BEC. Methods are outlined for identifying biogeoclimatic and site units. The biogeoclimatic section contains overviews and diagnostic keys, plus tables summarizing the vegetation, environment, climate and forest productivity, of most KFR biogeoclimatic units. To assist users in identifying site units, 6 pages are presented for each subzone and variant. These pages include: an overview, edatopic grid, mesoslope diagram, vegetation table, environment table, and dichotomous key. The interpretation section contains stocking standards, guidelines for assessing site sensitivity to slashburning, tables summarizing the occurrence of forest pests, and a table of recommended forage seed mixes. The appendices include: classification conversion tables, an indicator species list, and keys for determining soil textures, humus forms, landforms, bedrock geology, soil development, and soil moisture and nutrient regimes.

The field guide does not contain an exhaustive discussion of the principles and concepts of site classification, or the procedures for site identification. Users are encouraged to attend one of the many training sessions held throughout the KFR each year.

This guide is available as an office-sized document and as a two-part pocket-sized field guide. Its modular format allows users to reorganize the material according to local conditions and personal requirements. Individual biogeoclimatic units, site unit descriptions, stocking standards, and appended keys can be extracted and moved. Peel-and-stick tabs displaying major headings are provided to help users locate required information.

Biogeoclimatic maps showing the distribution and extent of zones, subzones and variants in the KFR are available at 1:000 000 and 1:500 000 scales. A 1:250 000 scale map atlas is being prepared for future distribution. A plant guide has been produced to help field staff identify key indicator species.

Questions should be directed to the Kamloops Regional Research Ecologist, B.C. Ministry of Forests, 515 Columbia Street, Kamloops, B.C. V2C 2T7 (Telephone: 828-4131).

2 BIOGEOCLIMATIC ECOSYSTEM CLASSIFICATION PRINCIPLES

2.1 Concepts and Definitions

BEC is an ecological classification that groups similar segments of the landscape, called **ecosystems**, to form categories of a hierarchical classification system. In general, an ecosystem is the product of a complex interaction of vegetation, animals, microorganisms and the physical environment. An ecosystem may be the size of a drop of water or an entire watershed. For our purpose, however, an ecosystem is defined as a particular plant community and its associated physiography, soil and climate. Each ecosystem occupies a segment of the landscape. Boundaries are rarely abrupt; instead, ecosystems grade slowly from one to another.

Climate is the most important factor influencing the development of terrestrial ecosystems. The hot, dry grasslands around Kamloops reflect a much drier climate than either the moist cedar-hemlock forests surrounding Shuswap Lake or the cold, snowy environment on Tod Mountain. Within each of these climatic areas, ecological variation exists as a result of differences in physiography and soil. Very different vegetation is displayed on floodplains than on adjacent mid-slopes or rock outcrops. Ridge crests and upper slopes are drier than depressions and steep, south slopes are warmer than adjacent north slopes.

Heavy reliance is placed on vegetation when ecosystems are being classified and identified, because it is the most readily visible feature on a landscape. Vegetation best reflects the environment, biology and history of a site. Because of disturbance, the composition and structure of the vegetation changes over time. This process is called **succession**. For example, when old-growth stands are clearcut or burned, they generally revert to herb-dominated plant communities, which are rapidly replaced by shade-intolerant species such as western white pine, lodgepole pine, Sitka alder and willow. Lacking further disturbance, a stable, self-perpetuating, shade-tolerant **climax** community will again occupy these sites. Since successional plant communities change constantly, and vary according to the type and intensity of disturbance, we used climax or near climax vegetation to develop the classification presented. All sites, regardless of their successional status, can be classified according to their potential climax.

The hierarchical structure of BEC has four major components: vegetation, climate, site and succession. For practical purposes, field staff need only be familiar with the climate and site levels illustrated in Figure 2.

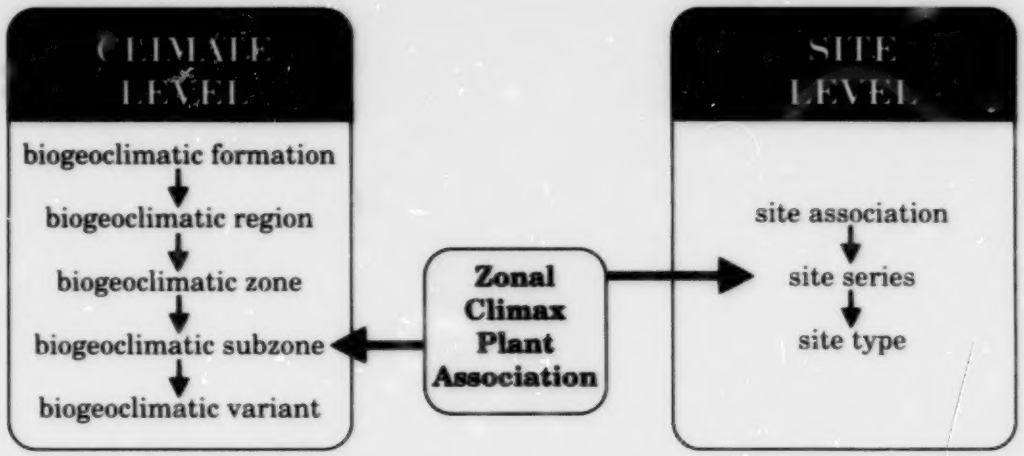


FIGURE 2. The hierarchical structure of the climate and site levels of the biogeoclimatic ecosystem classification system.

The **climate level**, often referred to as the biogeoclimatic level, accounts for geographical areas with similar climates. The subzone is the fundamental category of the climate level. Zones, regions and formations are established by grouping subzones to represent increasing levels of climatic generalization. Variants are subdivisions of subzones. Formations and regions are sufficiently generalized that they have limited practical value. They are not discussed in the guide. Although basing the biogeoclimatic classification on climate data is desirable, lack of such data, combined with a poor understanding of the climatic factors responsible for development of biogeoclimatic units, necessitates the use of vegetation on zonal sites to infer meaningful climatic units.

Zonal sites represent the midpoint between environmental extremes within biogeoclimatic units. Climate is best expressed by a specific combination of physical features which constitute a zonal site. Zonal sites:

- have intermediate moisture and nutrient regimes.
- occupy mid-slopes and level sites on plateaus.
- occur on gentle to moderate slopes (5-30%).
- soils are moderately deep to deep (>50 cm), loamy-textured with <50% coarse fragments, freely drained, and lack root-restricting layers.
- occupy locations not subject to localized climatic conditions (such as frost pockets or steep, southern exposures).

The **site level** is used to permit classification of all segments of the landscape, within areas that have a similar climate. A plant association is a group of plant communities readily distinguished by the presence of a unique combination of species. Each plant community has a relatively uniform species composition and vegetative structure. All sites capable of producing a single plant association at climax are called **site associations**. The site association is subdivided into **site series** and **site types** to reflect more specific environmental conditions. Climax plant associations within the macroclimate of an individual subzone are referred to as a site series. As shown in Figure 2, the climax plant association of a subzone provides a link between BEC's climate and site levels. The site series is most heavily used by operational staff for interpreting the landscape.

2.2 Biogeoclimatic Units

The importance of climate in the development of ecosystems is recognized in BEC. Biogeoclimatic zones provide the initial stratification of the British Columbia landscape. In the province, broad climatic patterns are expressed regionally and elevationally. Regionally, the coastal maritime climate is distinct from the continental climate of the Interior. Northern latitudes have different temperature and solar regimes than the southern latitudes. Biogeoclimatic zones reflect these broad, regional differences. **Zones** represent large geographical areas with a broadly homogeneous macroclimate. They consist of closely related subzones. Because of the mountainous nature of the KFR, biogeoclimatic units also occur as elevational bands that represent significant differences in climate.

Zones are generally distinguished on the basis of the climax tree species for which the zones are named. Fourteen zones are currently recognized in British Columbia. Ten occur in the KFR: the Alpine Tundra (AT), Engelmann Spruce – Subalpine Fir (ESSF), Montane Spruce (MS), Sub-Boreal Spruce (SBS), Sub-Boreal Pine – Spruce (SBPS), Interior Cedar – Hemlock (ICH), Interior Douglas-fir (IDF), Coastal Western Hemlock (CWH), Ponderosa Pine (PP) and Bunchgrass (BG). The Ponderosa Pine – Bunchgrass zone (PPBG), as described by Krajina (1969) and Mitchell and Green (1981), has been divided to form the PP and BG zones. The SBPS is a new zone, established to account for the unique climate of the Chilcotin. It replaces a large portion of a zone, previously recognized by Krajina (1969), called the Cariboo Aspen – Lodgepole Pine zone (CALP).

The most obvious difference between zones is the climax tree species. However, when similar climax tree species occur in more than one zone (Engelmann and hybrid white spruce and subalpine fir occur in the ESSF, SBS and MS), understory vegetation is used to distinguish the zones. For example, the presence of white-flowered rhododendron, Sitka valerian and mountain arnica, and the absence of pinegrass and twinflower, distinguishes the ESSF from the MS and SBS.

Climatically, the BG is the hottest, driest zone in the province. Of the forested zones in the KFR, the PP zone has a hot, dry climate, while the ESSF zone has a cool, wet climate. The ICH zone has an intermediate climate, which is much more favourable for tree growth. The ICH has the most productive forests in the interior of British Columbia.

Zones occur along two distinct elevational sequences in the KFR. In the dry central and western part of the KFR, the sequence (from lowest to highest elevation) is BG, PP, IDF, MS, ESSF and AT. In the wetter northeastern part of the region, it extends from the ICH to the ESSF and AT.

Two or more **subzones** are amalgamated to form a zone. Consequently, subzones are climatically less variable, and geographically more confined, than zones. As an example, the ESSF zone occupies the interior of British Columbia from north of Williston Lake to the American border. Across this geographic range, the mean annual precipitation ranges from 41-250 cm. The very dry cold ESSF subzone (ESSFxc) receives 51-69 cm, the wet cold ESSF subzone (ESSFwc) receives 72-100 cm, and the moist warm ESSF subzone (ESSFmw) receives 90-250 cm annual precipitation. The reduction in climatic variability is reflected by the vegetation. The floristic characteristics of each subzone are unique. For example, white-flowered rhododendron is common in all ESSF subzones in the KFR, except the ESSFxc, while amabilis fir is restricted to the ESSFmw, which has a climate with a strong coastal influence. False azalea, oak fern and rosy twistedstalk are common in the ESSFwc, but absent from the ESSFxc and ESSFmw. Geographically, the ESSFmw is restricted to the leeward slopes of the Coast and Cascade ranges, the ESSFxc occupies the central portion of the Thompson Plateau, and the ESSFwc occupies the Shuswap Highlands and Monashee Range.

Subzones may also be distinguished on the basis of succession. Seral stands containing lodgepole pine are prevalent throughout the dry cool IDF subzone (IDFdk), but absent from the very dry hot IDF subzone (IDFxh). Ponderosa pine occurs most commonly in the very dry hot IDF subzone (IDFxh). Paper birch occurs on zonal sites only in the moist warm IDF subzone (IDFmw).

Biogeoclimatic **variants** are subdivisions of a subzone, and represent a further reduction in the climatic and geographic variability encountered within a subzone. However, the vegetative differences are generally more subtle than those which exist between subzones. Changes in the abundance (percent cover) and vigour of some species, and/or the presence of minor species, are used to recognize geographically and climatically distinct variants.

Variants may also be recognized by differences in the pattern of ecosystems on the landscape or variation in successional development. For example, the zonal vegetation of the Okanagan very dry hot BG variant (BGxh1) and the Thompson very dry hot BG variant (BGxh2) is very similar. However, the widespread occurrence of antelope-brush on non- zonal sites throughout the BGxh1 indicates less extreme winters than those of the more northerly BGxh2.

Biogeoclimatic **phases** are not recognized as formal categories in BEC. They are mapped to help resource managers interpret the landscape by showing extensive areas that do not contain zonal ecosystems. Biogeoclimatic phases contain ecosystems that do not reflect the regional climate. As an example, large grasslands and adjacent forests in the IDF are believed to have the same macroclimate; these large grasslands are called IDF grassland phases. We assume these grasslands persist for historical, topographical and soil-related reasons and not because of macroclimate. Extensive southern exposures dominated by dry ecosystems and extensive frost pockets have also been delineated as biogeoclimatic phases in the KFR.

Climax plant associations occupying zonal sites are used to infer climate. The distribution of equivalent zonal ecosystems is used to determine the geographic location and extent of each biogeoclimatic unit. Maps of the zones, subzones and variants are available, to simplify site identification. Four scales, ranging from 1:100 000 to 1:2 000 000, accommodate the different needs of operational staff.

2.3 Biogeoclimatic Names and Symbols

Zones are generally named after one or two dominant climatic climax tree species; an example is the Engelmann Spruce – Subalpine Fir zone (ESSF). In some instances, a geographical modifier is added to distinguish coastal zones from interior counterparts. Examples are the Coastal Douglas-fir zone (CDF) and Interior Douglas-fir zone (IDF). Upper-case alphabetic initials (IDF, ESSF) are used as map notations and as a shortened reference for each zone.

A series of connotatively meaningful, climatically based subzone names and symbols are used to distinguish the subzones. In the Interior, these names correspond to the precipitation and temperature regimes of the subzone, relative to other subzones in that zone. Two lower-case alphabetic characters are used to denote individual subzones. The first character refers to precipitation and the second to temperature. In the Interior, five precipitation terms and six temperature terms are used in various combinations to portray the relative climatic regime of each subzone. The terms are:

Precipitation Regime	**Temperature Regime**
x - very dry (xeric)	h - hot
d - dry	w - warm
m - moist	m - mild
w - wet	k - cool
v - very wet	c - cold
	v - very cold

Thus, IDFxh refers to the Very Dry Hot Interior Douglas-fir subzone. A single numeric character may follow a subzone's alphabetic characters, to indicate a variant. Recognized variants are numbered geographically from south to north. They are named after common geographical areas which typify the variant's distribution, such as centrally located drainage basins, mountain ranges, towns or lakes. The names of many variants in the KFR include "Thompson" or "Okanagan" to indicate their respective distribution. A lower-case alphabetic symbol may follow the variant's numeric symbol to indicate one of three phases mapped in the KFR. They include:

a - grassland phase

b - southern exposure phase

c - cool air drainage phase

Using the example below, the IDFxh1a is called the Okanagan Very Dry Hot Interior Douglas-fir variant, grassland phase.

Zone	Subzone	Variant	Phase
IDF	xh	1	a

Presently, there are approximately 20 mapped polygons in the KFR which are not classified to the subzone level. These units have been designated with an asterisk (*) to replace the two subzone symbols. Readers interested in further details should contact the Regional Research Ecologist, B.C. Ministry of Forests.

2.4 Site Units

Within each subzone or variant, there is a unique, recurring sequence of environmentally and vegetatively distinct ecosystems. Each reflects differences in slope position, slope gradient, aspect and soil depth, texture, drainage, moisture regime and nutrient regime. As one proceeds downslope from rocky ridge crests to valley bottom depressions, changes in vegetative composition, vigour and structure can be observed that correspond to changes in topographic relief and soil characteristics. As illustrated on the mesoslope diagrams presented in subsequent sections, tree species composition also changes in accordance with variation in the site's physical environment.

Soil moisture availability is believed to have the greatest influence on ecosystem development (Krajina 1969; Klinka *et al*. 1984). Soil moisture is obviously influenced by climate, but since climate is relatively uniform within a subzone, variation in soil moisture availability results from redistribution of precipitation by soil and physiographic conditions. The driest ecosystems invariably occupy rocky ridge crests with a southern exposure; the wettest ecosystems occupy depressions, with a water table at or near the surface. Along the moisture gradient between these two extremes is a unique sequence of plant associations.

All landscape positions within a subzone or variant that are capable of producing a single plant association at climax are together called a **site series**. Historically, a site series has been referred to as an "ecosystem association". Each site series is readily identified, under climax conditions, by the presence or absence of key indicator species. The task of site identification is more difficult for disturbed or successional conditions, where greater reliance must be placed on site features, such as soil moisture regime and nutrient regime, for identification. Procedures for site identification are outlined in later sections of the guide.

A single plant association may occur in several subzones or variants. The Fd — Pinegrass — Feathermoss plant association represents the zonal site series in the IDFdk1. It also represents site series in the IDFmw2 and in the ICHmw3; these occupy dry southern slopes with shallow and/or coarse-textured soils. The climatically moister ICHmw3 and IDFmw2 receive greater annual precipitation than the IDFdk1. The additional precipitation compensates for the drier slope positions and results in a similar soil moisture availability, hence the same plant association. Each represents a separate site series because their climates are different, but they all belong to the same **site association** because they have the same plant association. Site associations are recognized for interpretive reasons. A treatment response will be less predictable for a site association than a site series, since climatic, topographic and soil conditions are more variable within a site association.

Soil texture, slope, aspect, parent material and slope gradient may also be highly variable within the range of ecosystems representing a single site series. To accommodate more site-specific interpretations, the site series can be partitioned into **site types** based on one or more specific soil factors and/or physiographic features. The Cw — Devil's club — Lady fern site series can be subdivided into many site types, depending on the users' objectives. Cw — Devil's club — Lady fern site types may include: gentle slope; steep slope; sandy; loamy; and sandy, gentle slope.

Site units may be mapped for special-use areas of limited extent. However, province-wide mapping of site units at an operationally appropriate scale would be expensive and time-consuming. As a result, field guides have been prepared to assist users in the field identification of site units.

2.5 Site Unit Names and Symbols

The names of site associations follow a provincially accepted naming convention. Each name is unique and generally consists of one or two tree species followed by one or two dominant understory species. The combination of species often provides a clue to the general appearance of the named plant community. Common names have been used to assist operational staff unfamiliar with the scientific names of indicator species. Codes for tree species are used to shorten names and indicate the order or suborder level of the vegetation classification to which the site association belongs. Tree species codes are presented in Appendix 4. Understory species are listed according to growth form. For example, shrubs are listed before herbs, and herbs before mosses. The herb, "pinegrass", precedes the moss, "feathermoss", in the Fd — Pinegrass — Feathermoss plant association. Both are dominant indicator species in the understory. When two species with the same growth form, such as oak fern and foamflower, are used to name the association, the most abundant species is listed first, as in the name CwHw — Oak fern — Foamflower.

In the site series name, the site association name is prefaced by the biogeoclimatic symbol and separated by a slash. An example is IDFdk1/Fd — Pinegrass — Feathermoss. Since such lengthy names are cumbersome, each site series has been assigned a number. These numbers facilitate coding on data sheets and presentation in tables and diagrams. If, for example, 10 associations have been identified in a subzone, the numbers 1 through 10 are used to identify the associations.

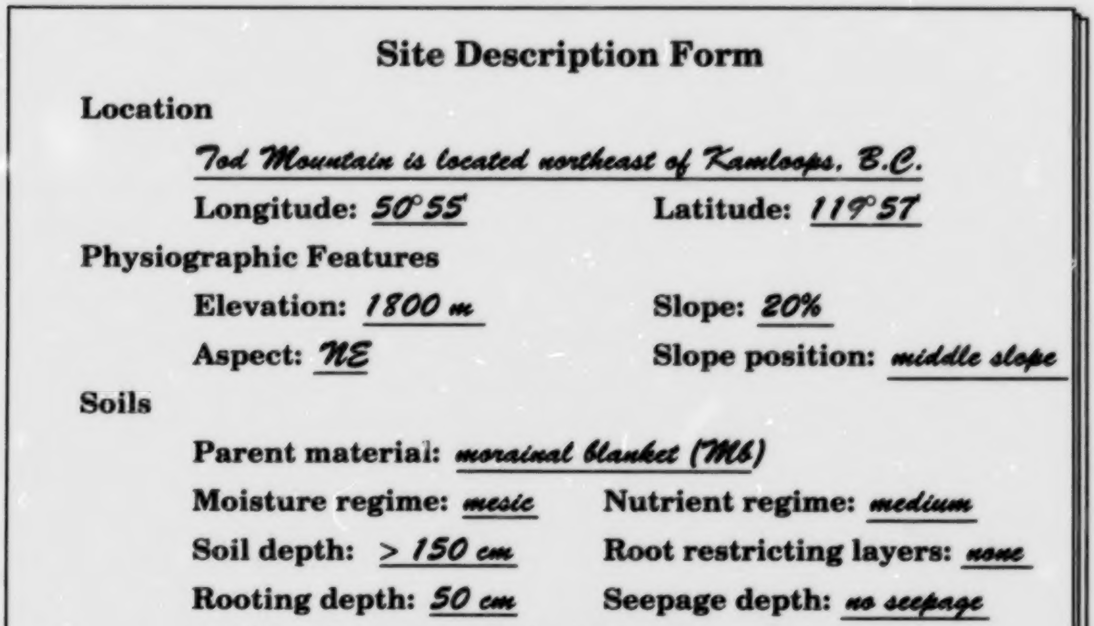
The zonal site is always assigned the number 01, to facilitate easy identification of the zonal site series. This has been done because recognition of the zonal site is critical in the identification of biogeoclimatic units. Other site series are numbered sequentially from the driest to the wettest. As a result, the driest recognized site series is always labelled number 02. When two identified units have the same moisture regime, the unit with the poorest nutrient regime has the lower number. A zero precedes single digit numbers to minimize confusion with soil moisture regime codes.

An exception to these numbering rules exists for site units in the grassland phases. The number 9 replaces the zero for recognized site series in the IDFxh1**a**, IDFxh2**a** and IDFdk1**a**. For example, 92 is used instead of 0,2 to minimize potential coding errors and to emphasize that these units occur in a biogeoclimatic grassland phase.

A small number of successional plant associations have been recognized. In general, they are successional stages of the zonal site series. They are distinguished by adding YS (young seral), MS (mature seral), or YC (young climax) to the site series number. For example, 01-YS is a seral stage of the 01 site series.

3 PROCEDURES FOR SITE IDENTIFICATION

Site identification involves two major steps. The first is correct identification of the subzone or variant. The second involves working through the site identification aids, to determine the site series. This field guide has been designed for quick and easy site identification. However, the ease of site identification, and the user's ability to read the landscape accurately, will vary according to the user's plant and soil identification skills. A description for a site near Tod Mountain, northeast of Kamloops, is provided in Figure 3. It summarizes the kind of information required for assessing a site and is used as a working example throughout this section of this guide.



Site Description Form

Location

Tod Mountain is located northeast of Kamloops, B.C.

Longitude: *50°55* **Latitude:** *119°57*

Physiographic Features

Elevation: *1800 m* **Slope:** *20%*

Aspect: *NE* **Slope position:** *middle slope*

Soils

Parent material: *morainal blanket (Mb)*

Moisture regime: *mesic* **Nutrient regime:** *medium*

Soil depth: *> 150 cm* **Root restricting layers:** *none*

Rooting depth: *50 cm* **Seepage depth:** *no seepage*

Soil development: *Orthic Humo-Ferric Podzol*

Humus form: *Hemimor* **Humus depth:** *8 cm*

Soil texture: *loam* **Coarse fragment content:** *25%*

Coarse fragment geology: *volcanic andesite*

Bedrock Geology: *volcanic andesite*

Vegetation

Trees: *Mature climax stand; Se - 20%, Bl - 15%, Pl - 10%*

Shrubs: *40% white-flowered rhododendron* *10% black huckleberry*

Herbs: *7% Sitka valerian* *5% grouseberry*

1% five-leaved bramble *2% mountain arnica*

1% one-leaved foamflower

Mosses: *5% red-stemmed feathermoss* *2% Brachythecium spp.*

FIGURE 3. An example of a site description.

3.1 Identifying Biogeoclimatic Units

Before departing for the field, you should check a biogeoclimatic map and determine which subzones occur in the area to be visited. Then quickly review pertinent vegetation and environment tables, keys and biogeoclimatic overviews to become familiar with distinguishing features. While travelling to the site, attempt to confirm subzone boundaries by using the information reviewed in the office.

The simplest approach to subzone identification is to locate your site on a biogeoclimatic map. Use of 1:100 000 scale maps is recommended. If you reach the site in question without a map, or the site is located in a transition area between two subzones, or the map's accuracy is questionable, then take steps in the field to confirm or identify the correct subzone. Three approaches to field identification of subzones are outlined in Figure 4.

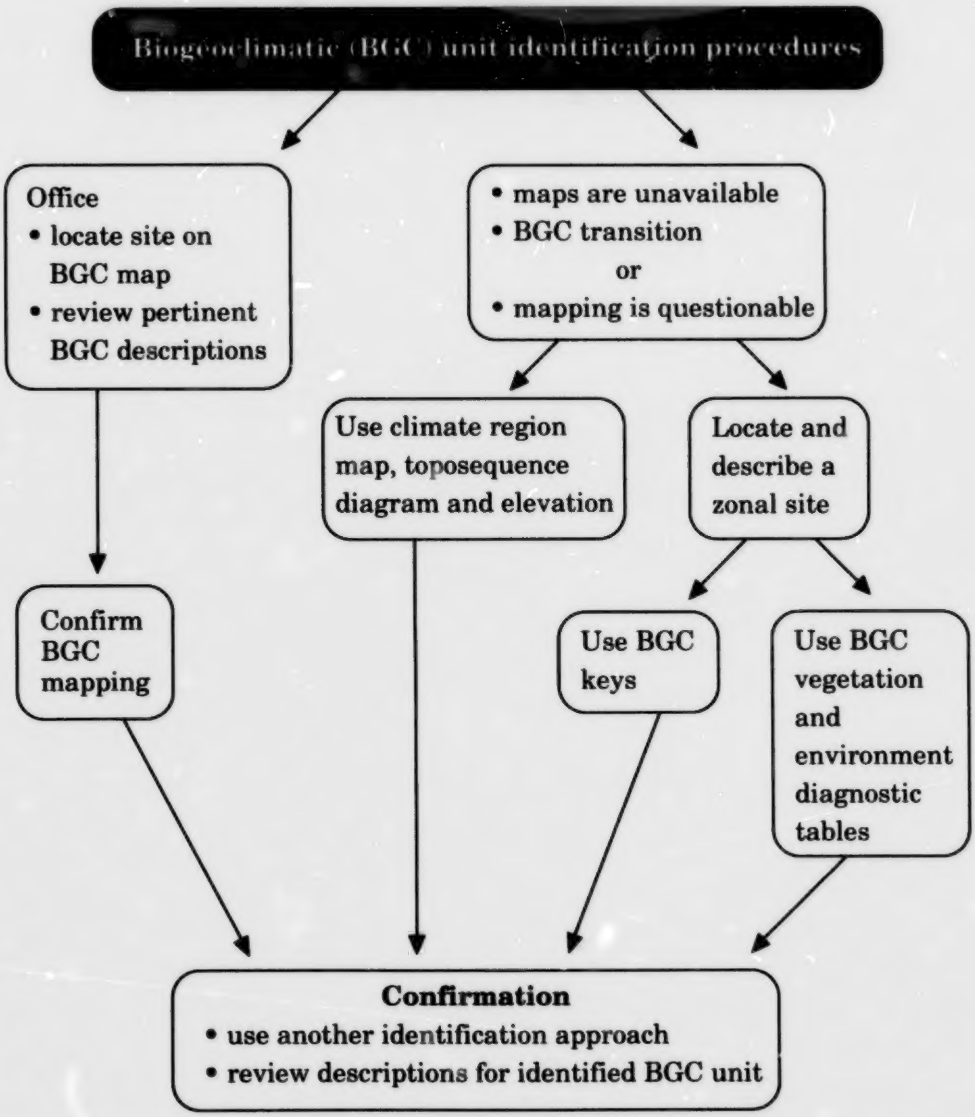

Biogeoclimatic (BGC) unit identification procedures
Office
• locate site on BGC map
• review pertinent BGC descriptions
• maps are unavailable
• BGC transition
or
• mapping is questionable
Use climate region map, toposequence diagram and elevation
Locate and describe a zonal site
Confirm BGC mapping
Use BGC keys
Use BGC vegetation and environment diagnostic tables
Confirmation
• use another identification approach
• review descriptions for identified BGC unit

FIGURE 4. A flow chart illustrating procedures for identifying biogeoclimatic units.

One approach to subzone identification involves using the climate region map shown in Figure 5. The KFR has been stratified into six broad climatic belts aligned in a north-south direction. These climatic belts reflect the flow of arctic, continental and maritime air masses through the province's southern Interior. The names Dry, Very Dry, Wet, Very Wet and Wet-belt Transition reflect these areas' mean annual precipitation. These climate belts have been further divided to form Northern, Southern and, occasionally, Central units, for example, Northern Very Dry and Southern Very Dry. As illustrated in Figure 6, each climate region has a unique elevational sequence of subzones or variants. These elevational sequences are called toposequences.

When the elevation of a site is known, it is possible to determine the subzone.The Tod Mountain example (Figure 3), is located in the Central Dry climate region. By referring to the Central Dry toposequence diagram, we find that an elevation of 1800 m corresponds to the ESSFdc2 variant. It is worth confirming the subzone identification by comparing the ESSFdc2's 1-page overview with the site's characteristics. For sites located near the climate region boundary, or the elevational boundary shown on the toposequence, it may be necessary to compare the vegetation and environment descriptions of two biogeoclimatic units for correct identification. If the site is located in the transition between two subzones, it should be noted, and any interpretive prescriptions should reflect this fact.

Another approach to subzone identification requires locating a mesic or zonal site near the site in question. From the biogeoclimatic keys for the zones, subzones and variants, it should be relatively easy to determine the correct subzone or variant. When we work through the Kamloops Biogeoclimatic Zone Key (page 30), using the Tod Mountain example (Figure 3), we find that the area is forested, the climax stands contain Se and Bl, the site occurs at high elevations, and white-flowered rhododendron and Sitka valerian are present. Based on these conditions, we can conclude that the site is located in the ESSF. We then turn to the "Kamloops ESSF Biogeoclimatic Key" (page 68) to determine the subzone. Starting at the top of the key, we find that Tod Mountain is not located along the western regional boundary and that Ba is not present in the area. Thus, we follow the "NO" direction. Working through the key, we find "NO" is the answer to the description in each box, until we reach the last box at the bottom right-hand corner of the page. We conclude the site occurs in the ESSFdc2.

It is also possible to determine the correct subzone by using the biogeoclimatic vegetation tables. First, locate a mesic or zonal site near the site in question. Use the Kamloops Zonal Vegetation Table (page 27), and the Tod Mountain example (Figure 3) to compare the vegetative composition of each zone. The presence of Engelmann spruce, subalpine fir, white-flowered rhododendron and Sitka valerian and the absence of western redcedar, hemlock, ponderosa pine, Douglas-fir, and numerous understory species, such as big sage, bluebunch wheatgrass and pinegrass, leads to the conclusion that the site is located in the ESSF. Using the Kamloops ESSF Subzonal Vegetation Table (page 65), we conclude that the Tod Mountain site (Figure 3) is located in the ESSFdc. This subzone is distinguished from the ESSFmw by the lack of amabilis fir; from the ESSFwc and ESSFvc by the lack of false azalea, oak fern, and rosy twistedstalk;

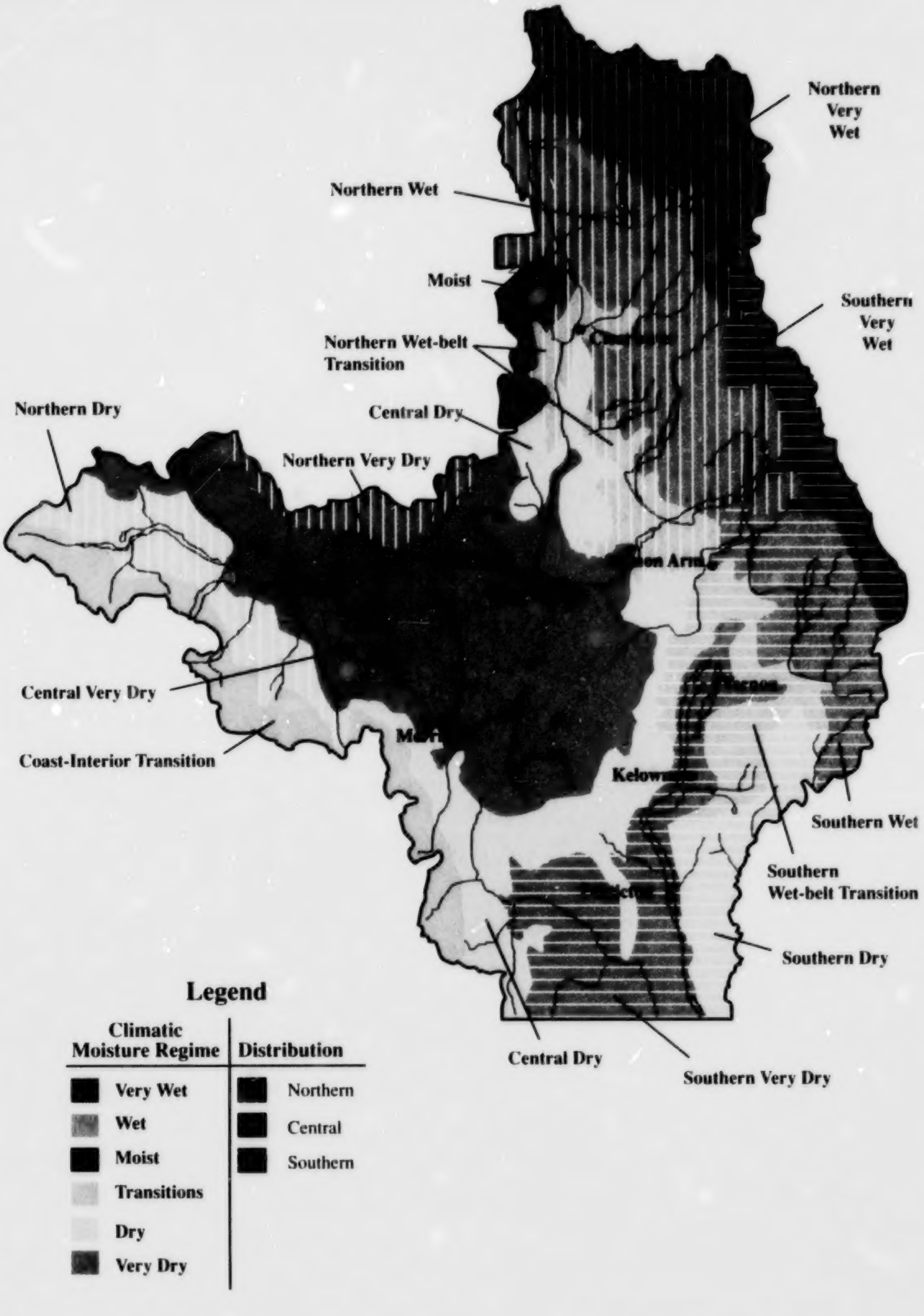
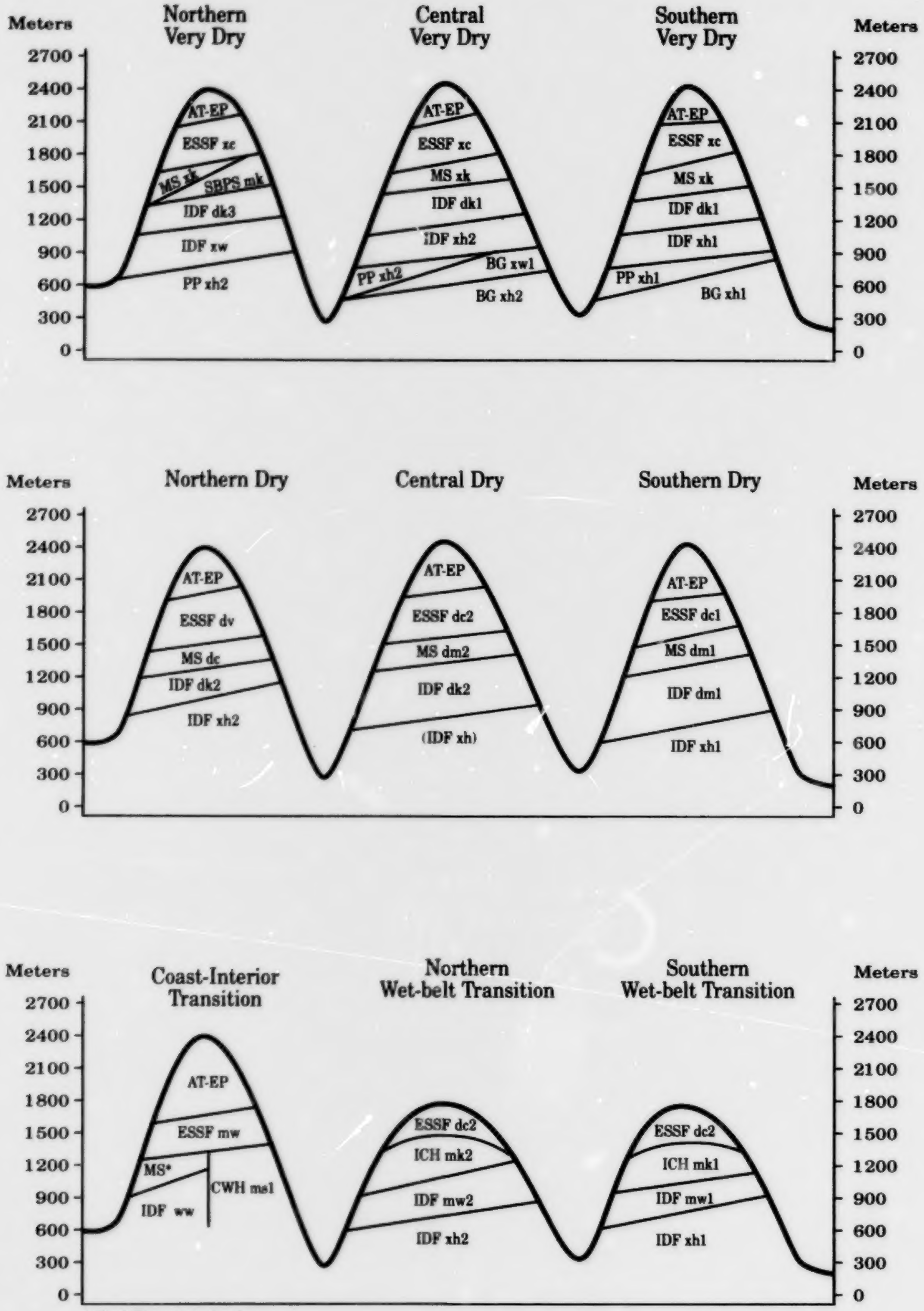


FIGURE 5. Climate regions of the Kamloops Forest Region.



* Undifferentiated subzone

FIGURE 6. Toposequence diagrams showing the elevational relationship of biogeoclimatic units within each climate region.

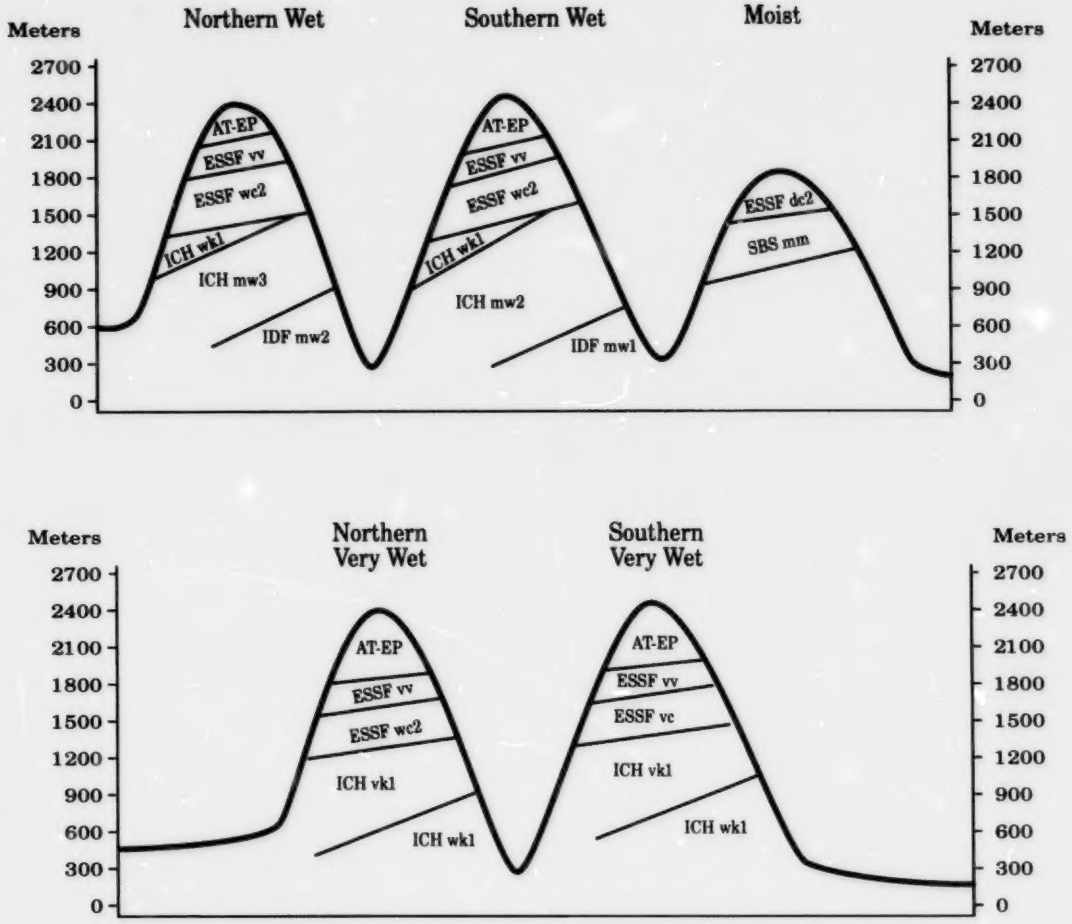


FIGURE 6. (Continued). Toposequence diagrams showing the elevational relationship of biogeoclimatic units within each climate region.

from the ESSFxc by the presence of white-flowered rhododendron; and from the ESSFdv by the presence of grouseberry and Sitka valerian.

You should use at least two approaches to confirm the biogeoclimatic identification. Once a subzone has been identified, the 1-page summary for that subzone should be reviewed to determine whether the location, vegetation characteristics and biogeoclimatic features match the site description.

3.2 Identifying Site Units

Once the subzone or variant has been identified, the next task is to identify the site series. The steps are summarized in Figure 7. The first is to walk the area, watching for pronounced changes in topography, vegetation and soil drainage that indicate the presence of more than one ecosystem. Select a spot that is representative of the area. Avoid transitions, and ecosystems too small to influence management decisions. Establish a 20 m x 20 m vegetation plot with a soil pit in the middle. Record the physiographic characteristics (slope, aspect, slope position, surface shape), soil features (texture, coarse fragment content and mineralogy, depth, drainage, humus form and depth, evidence of seepage or root-restricting layers, and presence, type and depth of A horizons), and composition and percent cover of the vegetation. A soil pit at least 50 cm deep should be dug to assess the soil features. The soil pit should not be located on skid trails, atypical substrates or microsites. Keys and tables are presented in the appendices to assist field staff to determine the soil texture, humus form, bedrock geology, parent material and soil development. Collected physical and biotic data are used to identify the site and develop interpretations. Therefore, it is important to produce a description that accurately depicts the site conditions.

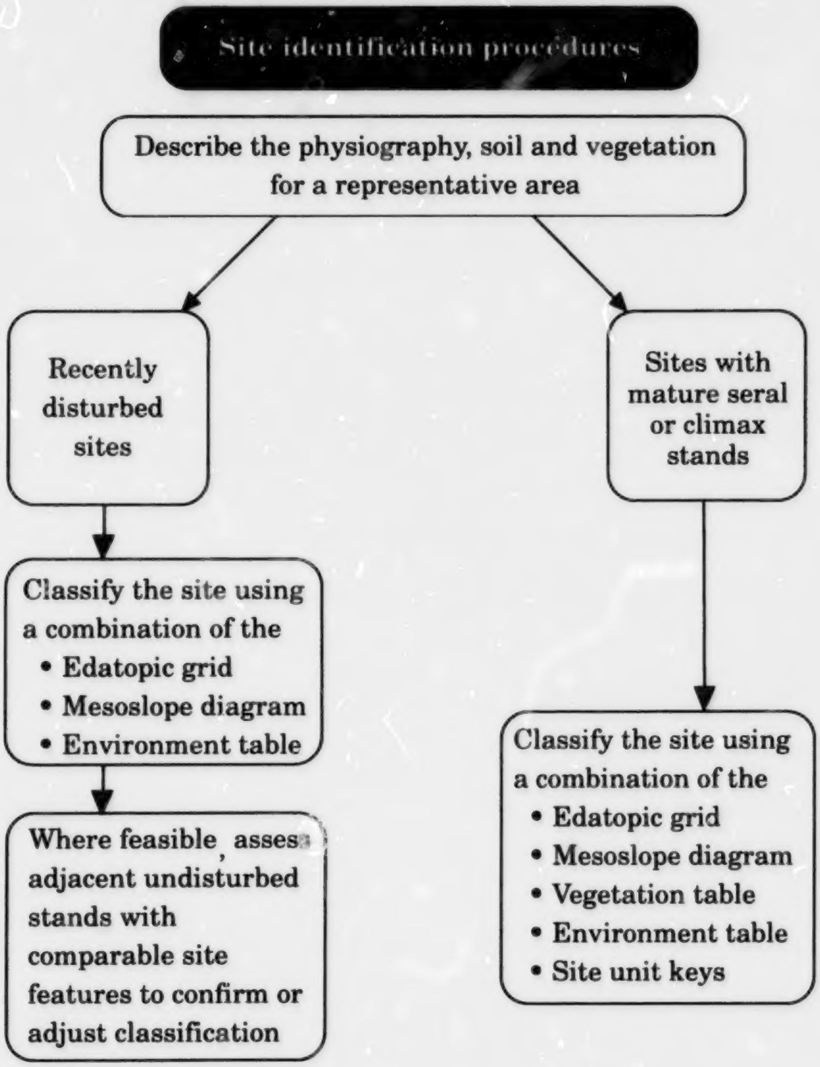

Site identification procedures
Describe the physiography, soil and vegetation for a representative area
Recently disturbed sites
Sites with mature seral or climax stands
Classify the site using a combination of the
• Edatopic grid
• Mesoslope diagram
• Environment table
Where feasible, assess adjacent undisturbed stands with comparable site features to confirm or adjust classification
Classify the site using a combination of the
• Edatopic grid
• Mesoslope diagram
• Vegetation table
• Environment table
• Site unit keys

FIGURE 7. A flow chart illustrating procedures for identifying site units.

The fifth and largest section of this guide contains diagnostic aids to help the user identify the site units for most subzones and variants in the KFR. They include:

- an overview of the location, climate, ecosystems and diagnostic features of the biogeoclimatic unit
- an edatopic grid
- a mesoslope diagram
- a vegetation summary
- an environment summary
- a dichotomous key to the site units

There are two paths to site identification, as shown in Figure 7. One applies to recently disturbed or young successional stands; the other applies to late seral and climax stands. Because development of the classification is based on late seral and climax stands, for these stands, all of the site identification tools presented may be used to determine the site series. Vegetation descriptions and keys are of less value when identifying disturbed or younger successional stands. Therefore, a greater reliance must be placed on the site's physical characteristics. This means using the edatopic grid, environment table and mesoslope diagram for site identification. When surveying recently disturbed areas such as clearcuts, the user is advised to check the adjacent undisturbed stand to confirm the identification.

In most cases, it is not necessary to use all of the aids presented to identify a site. However, use of more than one is recommended. The vegetation and environment descriptions for the identified site should be checked to confirm the identification. If the match is poor, the steps followed to identify the site should be checked. It is possible the area is transitional between two classified units, or represents an ecosystem that has not been classified. In either case, the situation should be documented. Unclassified ecosystems should be brought to the attention of the Regional Research Ecologist, B.C. Ministry of Forests.

A description of each diagnostic tool is also presented. A discussion of how each might be used to identify the previously described Tod Mountain site (Figure 3) is included.

3.2.1 Subzone and variant overviews

An overview has been prepared for each subzone and variant, summarizing the location, climate, vegetation, soils, and diagnostic biogeoclimatic features. More specific climatic and environmental information is outlined in the biogeoclimatic section of the guide. Overviews are provided to help users confirm the identity of biogeoclimatic units. The subzone's location description may be particularly useful; the map presented as Appendix 12 shows those physiographic areas of the KFR used in these descriptions. Standardized tree species codes from the B.C. Ministry of Forests, Inventory Branch (Appendix 4), are used in vegetation descriptions.

3.2.2 Edatopic grids

The range of soil moisture and nutrient conditions encountered within each subzone or variant is illustrated on an edatopic grid such as the one for the ESSFdc2 (page 236).

The soil moisture regime represents the vertical axis of the grid and refers to the relative amount of soil moisture available for plant growth in a subzone. A relative scale ranging from the driest very xeric (0) sites to the wettest subhydric (7) sites is used. In order of increasing moisture, they are: very xeric, xeric, subxeric, submesic, mesic, subhygric, hygric and subhydric. Corresponding numbers, 0 to 7, are used for coding. Mesic represents the mid-point of this moisture gradient. The mesic soil moisture regime is an important factor in defining zonal sites.

Soil moisture regimes correspond to the soil's ability to receive and store moisture. On xeric sites, precipitation is the only source of moisture This moisture is lost rapidly, due to the sites' low water-holding capacity, usually because soils are shallow, slopes are steep, or soils are coarse-textured. In contrast, hygric sites receive a continuous supply of subsurface seepage. Subhydric sites occupy depressions, where subsurface seepage and surface flow collects because runoff is restricted.

Soil moisture regime can be determined from slope position, soil depth, texture, coarse fragment content, slope gradient, aspect and sources of seepage. A table summarizing the role and relative importance of each of these factors is presented in Appendix 9. The key presented as Appendix 10 can also be used to assess soil moisture regime.

The soil nutrient regime is an indicator of the soil's ability to supply major nutrients required for plant growth. The horizontal axis of the edatopic grid represents soil nutrient regime. Five classes are recognized: very poor (A), poor (B), medium (C), rich (D), and very rich (E). Soil depth, texture, and coarse fragment content influence the soil's ability to store nutrients; seepage water, humus form, and the parent material's geologic source affect the soil's nutrient status. Each factor's contribution to soil nutrient regime is presented in Appendix 9. Zonal sites, which have a medium nutrient regime, are composed of deep, loamy-textured soils derived from moderately rich bedrock and occupy gentle slopes. Nutritionally poor soils tend to be coarse-textured, derived from granitic bedrock, and they have thin Mor humus forms. Soils may be enriched by seepage water originating from landscapes that are underlain by limestone or basalt. Mull humus forms reflect rapid rates of nutrient cycling, which lead to richer nutrient regimes.

The range of moisture and nutrient regimes of each site series is displayed on an edatopic grid. An overlap between two or more site units occurs on some edatopic grids. This suggests an environmental factor other than the soil moisture or nutrient regime contributes to the development of these overlapping ecosystems. When we use the aids presented as Appendices 9 and 10 for the Tod Mountain example, we determine that its soil moisture regime is mesic and the nutrient regime is medium. The ESSFdc2 edatopic grid shows that site units 04, 05, 01 and 06 occupy the mesic/medium grid position. When this occurs, field staff are encouraged to use additional site identification aids and good judgement to identify the site. In this example, 06 represents a wetter unit than 01 and site units 04 and 05 are generally drier and nutritionally poorer than 01. This and other site and plant indicators suggest 01 is the best choice.

3.2.3. Mesoslope diagrams

A mesoslope diagram is presented for each subzone and variant to illustrate the relative position of ecosystems on the landscape. For an example, refer to the ESSFdc2 mesoslope diagram on page 237. Numerous physical features are portrayed on mesoslope diagrams, including: aspect (north and south); slope position (ridge crests to depressions); parent materials; presence or absence of seepage water (temporary or permanent); and the presence of important tree species. South aspects include south- and west-facing slopes; north aspects include north- and east-facing slopes. Colluvial, morainal, fluvial, organic and bedrock parent materials are illustrated by various graphical patterns. Slopes greater than 35% are considered steep, while those less than 35%, including plateaus and terraces, are considered gentle. Tree species are portrayed by schematic figures resembling their natural silhouettes. The observed distribution of important tree species is portrayed. Because of scale, only the dominant tree species are shown. Relative abundance is not indicated. The tree species composition reflects the successional stage that dominates the landscape. There is a legend for the trees and parent materials found on each diagram. Illustrations for all schematic tree diagrams used in the guide are summarized in Appendix 4.

Major physiographic features, including valley terraces, plateaus and gentle slopes, valley bottoms and steep slopes, are shown. Valley bottoms generally occur at the base of steep slopes, as shown at the centre of the diagram. However, valley terraces, or plateaus and gentle slopes, may also occur at the base of steep slopes. Each segment of the diagram is further subdivided by slope breaks (◊) to show crests, upper slopes, middle slopes, lower slopes, toe slopes, depressions and level benches. Since soil texture, depth and drainage also influence ecosystem development, more than one site series can occupy a single slope position. One to four site series numbers are displayed above each slope position in order of dominance.

The mesoslope diagram cannot be used in isolation for site identification. However, it reduces the range of candidates to two or three. Using the Tod Mountain example, we find site series 01 and 05 are located at the extreme right-hand side of the Plateaus and Gentle Slopes section of the mesoslope diagram for the ESSFdc2 (page 237).

3.2.4 Vegetation tables

Vegetation tables compare the floristic composition of: site units in a subzone or variant; subzones in a zone; and some zones in the KFR. For an example, refer to the ESSFdc2 vegetation table on page 238. Plant species are summarized by scientific name on the left and common name on the right. The scientific names follow Taylor and MacBryde (1977), while the common names follow Meidinger (1987). Plant species are arranged by four structural layers: trees, shrubs, herbs, and mosses with lichens and liverworts. Dwarf woody plants such as prince's pine and grouseberry are included in the herb layer. Within each layer, the listing of species follows a moisture gradient. The driest indicator species are listed first and the wettest last. Along the top of the table, site units are arranged from driest to wettest. A maximum of 40 species are presented. Thus, many species are not included in these tables. More detailed vegetation summaries are available from the Regional Ecologist, B.C. Ministry of Forests, upon request.

Black bars representing prominence indicate the presence and abundance of selected species in a site series. Five prominence classes are used. Prominence incorporates the frequency of occurrence and percent cover of each species (Lewis *et al.* 1986). Prominence is calculated by taking the square root of the frequency times the cover. For example, when a species is present in 81% of sample plots and has a mean cover of 7%, the prominence equals 63 ($\sqrt{81} \times 7 = 63$).

In this guide, prominence levels from 0 to 201+ are grouped into five classes. There is one exception to the following classes: a species occurring 80-100% of the time, and with a cover of only 1%, is included in Prominence Class 2.

Prominence Value	**Prominence Class**	**Schematic**
0 - 15	1	Blank
16 - 50	2	▮
51 - 100	3	■
101 - 200	4	▬
201+	5	▬▬

Vegetation tables compare the floristic composition of site units. Some species occur in only one classification unit. This commonly occurs at the extreme ends of an environmental gradient. For example, some species occur only in the wettest or driest site units in a subzone. Most sites do not contain a species that is exclusive to that site. Instead, it is the presence or absence of a unique group of species that distinguishes one site from another.

The vegetation tables also provide a quick overview of the species composition, abundance and floristic structure of each classification unit. At a quick glance, it is possible to determine: whether a site is a grassland, forest or wetland; if it has a shrub, shrub-herb, herb, or moss-dominated understory, and major differences in the composition of the forest canopy. Species in a site unit with prominence values 4 and 5 provide a good overview of the site's general appearance.

Vegetation is an extremely useful indicator of site conditions in mature forests, but must be used with caution for assessing disturbed sites.

From the ESSFdc2 vegetation table, we find that our Tod Mountain example (Figure 3) has white-flowered rhododendron and Sitka valerian. Both species are present in sites 01, 06 and 07. The absence of black gooseberry, rosy twisted-stalk, Indian hellebore and oak fern indicates we are not in site units 06 and 07. We therefore conclude, from the vegetation alone, that this site should be identified as 01 (Bl – Rhododendron – Grouseberry site series).

3.2.5 Environment tables

The environmental characteristics of each site unit are presented for all subzones and variants in the KFR. A short explanation of each environmental parameter is provided.

Soil moisture regime has been briefly discussed in a previous section. Tables and keys to assist in field identification are provided in Appendices 9 and 10.

Prevailing successional stage sampled is used to characterize the successional stage which dominates the landscape. This stage was also used to develop the classification. As discussed in the introduction, succession refers to changes in the physical and biological characteristics over time. Climax conditions represent a relatively stable endpoint in the time sequence, while seral refers to successional stages leading to climax. Definitions for young seral, maturing seral, young climax, maturing climax, and disclimax are taken from Walmsley *et al.* (1980).

Young seral stands are generally composed of even-aged successional species less than 60 years old. Competition between individual trees is not apparent and climax tree species are not reproducing in the understory.

Maturing seral stands are dominated by successional species 60-140 years old. These stands contain climax or shade-tolerant tree species which fill gaps created by dying successional tree species.

Young climax stands are composed of shade-tolerant tree species that form the climax stand. These stands are generally even-aged and less than 60 years old.

Maturing climax stands are composed of the climax tree species, which range in age from young seedlings to mature dominants. These stands are more than 60 years old. Stand structure and understory composition are relatively stable.

Disclimax ecosystems are relatively uncommon. They represent a condition in which the species composition for a site differs from the expected climax. Generally, this results from permanent changes to the physical or biological characteristics of a site following disturbances such as logging, burning, or intensive grazing. Often, more than one of these factors is involved.

Aspect is a slope's orientation to the sun. It is measured with a compass. In this field guide, site units are generalized as northern or southern exposures. Northern exposures include: NW, NNW, N, NNE, NE, ENE, E and ESE directions . Some site series occur on every aspect. This is indicated by the word "all", while "N/A" (not applicable) is used for flat sites.

Slope gradient is the average inclination of the ground surface from the horizontal plane. Slope gradients have been grouped to form three general classes: steep, gentle and level. Steep indicates slopes greater than 35%; gentle refers to slopes of 10-35%; and level represents slopes of less than 10%.

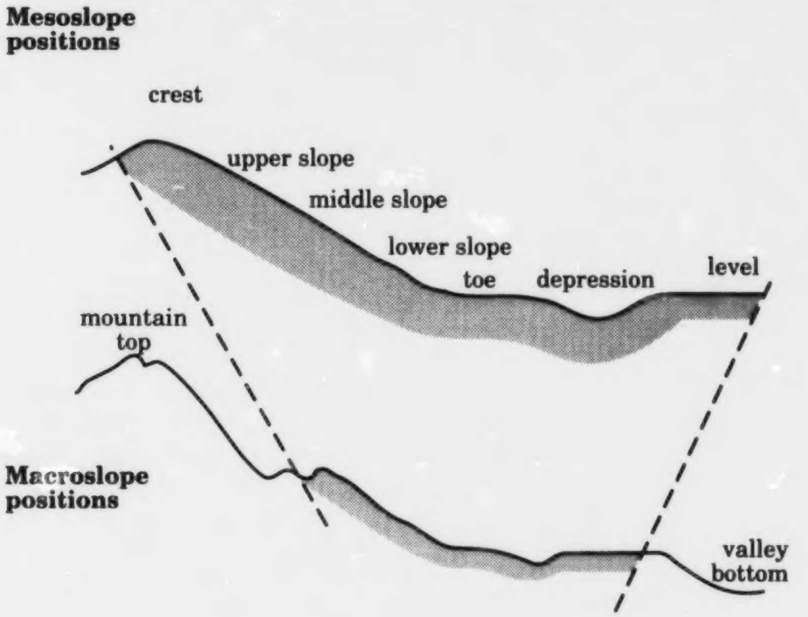


FIGURE 8. The location of mesoslope positions.

Mesoslope position is the relative location of a site on the landscape. This ranges from a crest to a depression, as illustrated in Figure 8. Slope positions are all defined in the text accompanying the key for identifying soil moisture regime (Appendix 10). Slope position may be abbreviated due to limitations in space on the environment table; for example middle (mid.), lower (low.), upper (upp.) and depression (depres.).

Soil texture relates to the relative amount of sand, silt and clay in the soil. A hand-texturing key (Appendix 5) is presented to determine soil texture in the field. Soil textures have been grouped into fine, medium and coarse classes. If the data used to develop a site unit's classification revealed more than one texture class, then texture was recorded as variable.

Coarse-textured (or crse.) soils are represented by sands and loamy sands. Medium-textured (or med.) soils consist of silts, silt loams, loams, sandy clay loams and sandy loams. Fine-textured soils include heavy clays, silty clays, clays, sandy clays, silty clay loams and clay loams.

Parent material provides the foundation from which soils develop. A key is presented as Appendix 8 to help field crews recognize colluvial (C), lacustrine (L), fluvial (F), glaciofluvial (FG), morainal (M), eolian (E), and organic (O) genetic materials. In general, we have added a lowercase letter to indicate the surface expression. The lower-case letter **v** (veneers) indicates soils less than 1 m thick and too thin to mask underlying surface irregularities. An example would be a morainal veneer (Mv). The lower-case letter **b** refers to unconsolidated deposits greater than 1 m thick, such as morainal blankets (Mb). The lowercase letter **t** indicates terraced landscapes and **f** indicates fans; both are generally associated with stream bank deposits of recent or glacial origin. A key for the identification of parent materials is presented in Appendix 8.

Important soil features indicate soil conditions that are important for diagnostic or interpretive reasons. Shallow soils are denoted by **L** (lithic), followed by an average depth to bedrock, measured in centimetres. For example, **L-50** indicates the soils are generally less than 50 cm deep. **W** is used to indicate that a watertable occurs at or near the soil surface. **Some L** and **Some W** indicate that some soils are shallow or have a water table within 1 m of the soil surface, respectively.

3.2.6 Site series keys

Diagnostic keys are another tool for determining a site series. Each key contains a series of pathways, starting at the top of the page. The path taken depends on decisions made about the diagnostic information described in each box. A **Yes** or **No** direction is followed, based on confirmation or rejection of the diagnostic information. Dry sites terminate on the left side of the page, and wet sites terminate on the right.

Site-description boxes occur at the forks. Diagnostic information presented in each box generally includes: slope position; aspect; stand composition; important soil features; soil moisture regime; and the presence, or absence, of important indicator species. The presence or absence of key indicator species consistently provides the most reliable diagnostic feature. Some species lists contain "and/or" statements, while others have percent cover stipulations. Physical site conditions and stand composition provides auxiliary information. To provide an identification check, the soil moisture regime is noted in boxes leading to site series identification numbers. It is important to confirm the identification by using other methods contained in this guide. The vegetation table provides the best test for undisturbed or climax stands.

We can use the ESSFdc2 site series key on page 240 to assess the previously described Tod Mountain site (Figure 3). The information in the key's first box is rejected, because our site is forested, does not occupy organic bogs, does not occur in depressions with a water table less than 50 cm, and has no sedges. The second box is rejected as the soils are more than 1 m deep and pinegrass, common juniper and yarrow are not present. It is not site unit 08, because there is no seepage water present and trapper's tea and scrub birch are absent. The lack of black gooseberry, Indian hellebore, clasping twistedstalk and oak fern prompts us to reject the information at the next junction. The presence of a well-developed shrub layer containing more than 5% white-flowered rhododendron and Sitka valerian fits our site's description. The mesic moisture regime is also correct. A review of the ESSFdc2 vegetation table confirms the identification as site unit 01.

4 BIOGEOCLIMATIC UNITS

This section of the guide summarizes the environmental conditions and zonal vegetation of major biogeoclimatic units in the KFR. Data are presented for 31 biogeoclimatic units, representing 7 zones, 24 subzones and 22 variants. Keys are presented to help users identify biogeoclimatic units. There is an overview for each zone, including the Alpine Tundra zone. This zone is not described elsewhere in the guide because of a lack of data. More detailed reports, describing the classification and characteristics of each zone, are being prepared in conjunction with the provincial correlation program

Thirteen additional biogeoclimatic units have been mapped in the KFR but are not described in this guide. These units occur in adjacent forest regions and have a limited distribution in the KFR. They are: BGxh3 (PPBGg), BGxw2 (PPBGe), IDFxw (IDFa2), IDFdk3 (IDFb2), ICHmk3 (ICHe2), ESSFwc3 (ESSFh2 and ESSFh3), SBSdw1 (SBSk1) and SBPSmk (SBSb), all described by B.C. Ministry of Forests and Lands (1987); IDFww (IDFe1), CWHds (CWHc1), CWHms (CWHb5), and MHmm2 (MHb), all described by Green *et al.* (1984); and SBSdh (SBSh), which is described in Meidinger *et al.* (1988).

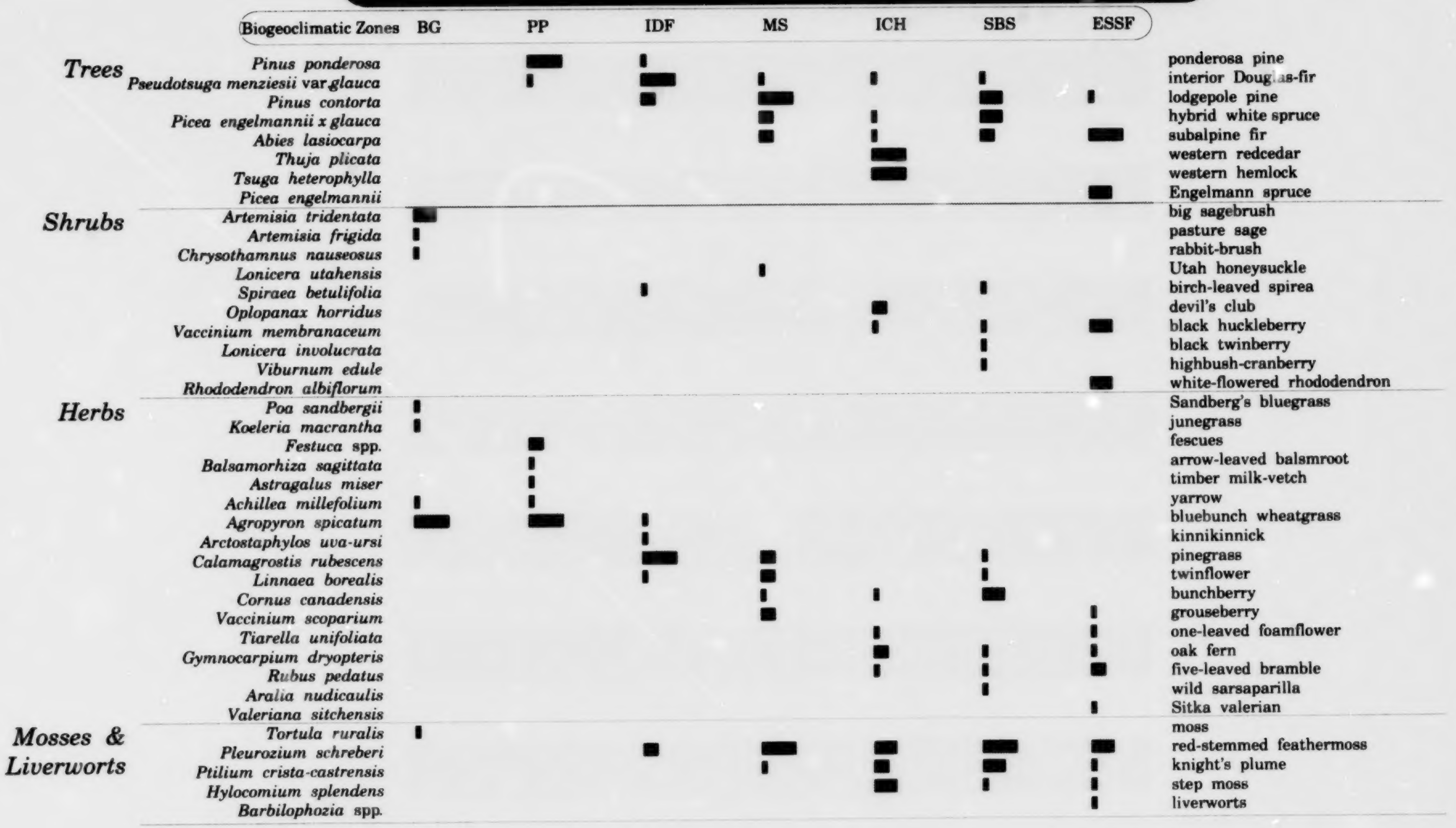
Appendix 1 is a table which compares old classification units with those described in this guide.

Biogeoclimatic maps of the KFR are available in several scales from the B.C. Ministry of Forests, Regional Forest Sciences Section.

Zones of the Kamloops Forest Region

There are 10 biogeoclimatic zones in the KFR. Eight of them are summarized and compared in the following section, including the BG, PP, IDF, MS, SBS, ICH, ESSF and AT. The CWH and SBPS are not described; their total area is very small in the KFR.

Vegetation of Some Zones in the Kamloops Region



Environmental Characteristics of Some Zones in the Kamloops Forest Region

Biogeoclimatic Zone		BG	PP	IDF	MS	ICH	ESSF
Physical							
Area - hectares		223271	254554	2340692	1098996	1117715	1707091
- percent of KFR[1]		2.8	3.5	29.0	13.6	13.9	21.2
Elevation range (m)		270-800	370-945	625-1280	1280-1560	660-1400	1450-1850
Soils							
Soil Classification[2]		B, DB	EB, B	GL, DYB, EB	DYB, GL, HFP	HFP, FHP DYB	HFP, FHP
Humus Form[3]		ZL	ZL, RD	HR, RD	HUR, HR	HUR, HR	HR, HUR
Humus Depth (cm)	mean	0.9	2.9	4.1	5.9	7.2	5.5
	range	0-5	1-6	2-9	1-13	2-18	2-20
Soil pH	mean	7.1	6.0	5.6	5.1	4.8	4.5
Tree Species							
Climatic Climax		None	Py, (Fd)	Fd, (Cw)	Sxw, Bl,	Hw, Cw, (Bl, Sxw)	Se, Bl, (Hm, Ba)
Other		(Py)	—	Pl, Lw, Sxw, Py, (Ep, At)	Pl, Fd, (Lw, At)	Pl, Fd, Lw, Pw, At, Ep, (Py)	Pl, (Pa)
Forest Productivity[4]							
Bl		—	—	—	24	27	19
Cw		—	—	(24)	—	25	—
Fd		—	19	25	27	33	—
Hw		—	—	—	—	26	—
Lw		—	—	—	33	36	—
Pl		—	—	24	25	—	22
Py		—	18	—	—	—	—
Sxw		—	—	(23)	26	32	22

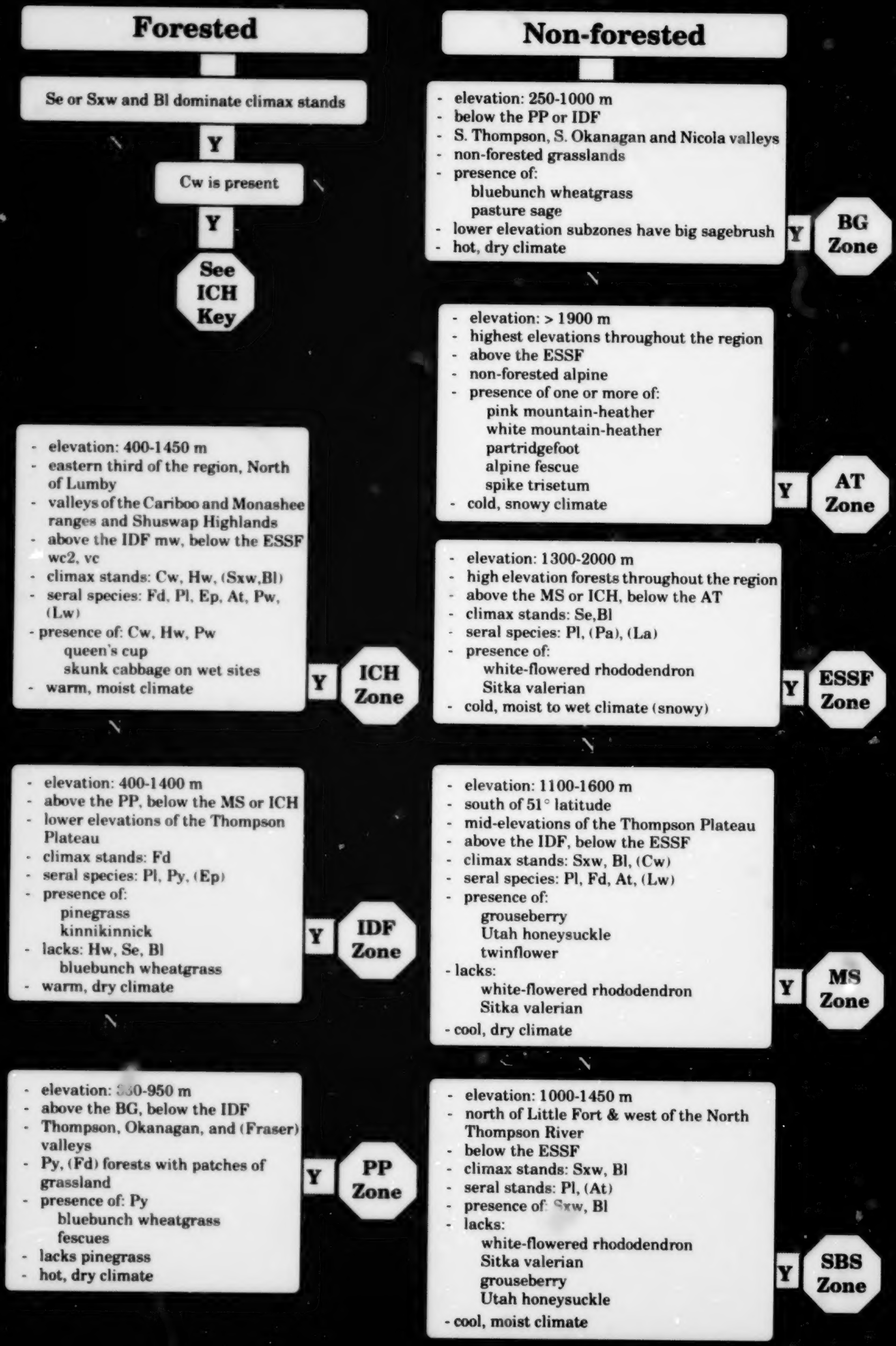
Environmental Characteristics of Some Zones in the Kamloops Forest Region (cont'd)

Biogeoclimatic Zone		BG	PP	IDF	MS	ICH	ESSF
Climate							
Annual Precip. (mm)	mean	285	335	476	630	919	1239
	range	160-458	258-391	295-843	355-912	430-1724	514-2402
Growing Season Precip. (mm)	mean	129	136	195	233	305	329
	range	79-225	94-175	113-313	132-325	194-461	205-587
Annual Snowfall (cm)	mean	81	97	170	314	450	867
	range	51-78	48-124	82-379	205-500	210-1100	247-1873
Annual Temp. (°C)	mean	7.9	7.8	5.0	2.8	4.8	0.5
	range	4.4-10.0	5.4-9.4	2.5-7.9	0.6-5.4	2.1-7.8	-1.3-4
Growing Season Temp. (°C)	mean	16.6	16.3	13.1	10.7	13.3	9.2
	range	12.9-18.9	13.2-18.5	9.7-16.6	9.1-11.6	11.0-17.0	7.1-14.1
Mean Min. Jan. Temp. (°C)	mean	-9.3	-8.9	-11.2	-13.6	-11.6	-12.7
	range	-6.9 – -13.5	-4.7 – -12.8	-7 – -16.4	-9 – -16.4	-1.8 – -15.8	-7 – -16
Growing Degree Days (>5°C)	mean	2068	1948	1420	900	1399	727
	range	1383-2513	1416-2413	862-2053	766-1108	990-1990	471-1166
Frost-Free Period (days)	mean	148	138	107	60	114	33
	range	79-192	75-171	50-156	20-103	84-154	9-66
Source of Clim. Data L/S/M/P[5]		14/1/10/0	9/0/14/0	28/13/30/0	6/1/14/1	15/2/16/0	4/4/6/9

Notes:

1. The AT, SBS, and CWH comprise the remaining 16%.
2. Canadian system of soil classification; see Appendix 6.
3. Klinka *et al*. 1981; see Appendix 7.
4. Site index-meters/100 years.
5. Normalized climatic data
   L = long-term AES
   S = short-term AES
   M = MOE growing season data
   P = predicted from elevational relationships

Kamloops Biogeoclimatic Zone Key[1]



Forested

Se or Sxw and Bl dominate climax stands

Y

Cw is present

Y

See ICH Key

- elevation: 400-1450 m
- eastern third of the region, North of Lumby
- valleys of the Cariboo and Monashee ranges and Shuswap Highlands
- above the IDF mw, below the ESSF wc2, vc
- climax stands: Cw, Hw, (Sxw,Bl)
- seral species: Fd, Pl, Ep, At, Pw, (Lw)
- presence of: Cw, Hw, Pw
  - queen's cup
  - skunk cabbage on wet sites
- warm, moist climate

Y **ICH Zone**

- elevation: 400-1400 m
- above the PP, below the MS or ICH
- lower elevations of the Thompson Plateau
- climax stands: Fd
- seral species: Pl, Py, (Ep)
- presence of:
  - pinegrass
  - kinnikinnick
- lacks: Hw, Se, Bl
  - bluebunch wheatgrass
- warm, dry climate

Y **IDF Zone**

- elevation: 330-950 m
- above the BG, below the IDF
- Thompson, Okanagan, and (Fraser) valleys
- Py, (Fd) forests with patches of grassland
- presence of: Py
  - bluebunch wheatgrass
  - fescues
- lacks pinegrass
- hot, dry climate

Y **PP Zone**

Non-forested

- elevation: 250-1000 m
- below the PP or IDF
- S. Thompson, S. Okanagan and Nicola valleys
- non-forested grasslands
- presence of:
  - bluebunch wheatgrass
  - pasture sage
- lower elevation subzones have big sagebrush
- hot, dry climate

Y **BG Zone**

- elevation: > 1900 m
- highest elevations throughout the region
- above the ESSF
- non-forested alpine
- presence of one or more of:
  - pink mountain-heather
  - white mountain-heather
  - partridgefoot
  - alpine fescue
  - spike trisetum
- cold, snowy climate

Y **AT Zone**

- elevation: 1300-2000 m
- high elevation forests throughout the region
- above the MS or ICH, below the AT
- climax stands: Se,Bl
- seral species: Pl, (Pa), (La)
- presence of:
  - white-flowered rhododendron
  - Sitka valerian
- cold, moist to wet climate (snowy)

Y **ESSF Zone**

- elevation: 1100-1600 m
- south of 51° latitude
- mid-elevations of the Thompson Plateau
- above the IDF, below the ESSF
- climax stands: Sxw, Bl, (Cw)
- seral species: Pl, Fd, At, (Lw)
- presence of:
  - grouseberry
  - Utah honeysuckle
  - twinflower
- lacks:
  - white-flowered rhododendron
  - Sitka valerian
- cool, dry climate

Y **MS Zone**

- elevation: 1000-1450 m
- north of Little Fort & west of the North Thompson River
- below the ESSF
- climax stands: Sxw, Bl
- seral stands: Pl, (At)
- presence of: Sxw, Bl
- lacks:
  - white-flowered rhododendron
  - Sitka valerian
  - grouseberry
  - Utah honeysuckle
- cool, moist climate

Y **SBS Zone**

BUNCHGRASS ZONE

Location and Distribution: The BG zone occurs in British Columbia at lower elevations of the Okanagan Valley south of Summerland, the Similkameen Valley around Keremeos, the Thompson River Valley from Spences Bridge east to Pritchard, the Nicola River Valley, and the middle Fraser and lower Chilcotin River Valleys from the junction downstream to Lillooet. Most of the BG zone occurs in the KFR. The exception is the area north of Big Bar Creek on the Fraser River. Similar vegetation zones are very extensive in the Columbia Basin south of Osoyoos. Elevations range from 250 to 1000 m.

Climate: The BG is characterized by warm to hot, dry summers, and moderately cold winters with little snowfall. Detailed climatic data is summarized in the table, BG Environmental Characteristics. Because spring is normally dry and summer precipitation evaporates rapidly, plant growth depends mainly on winter moisture. When combined with summer droughts and high temperatures, this results in the development of grassland vegetation. Kamloops, Osoyoos and Merritt have climates characteristic of the BG.

Vegetation: Climax sites in good range condition are characterized by widely spaced bunches of bluebunch wheatgrass and a well-developed lichen crust. Sandberg's bluegrass is present in minor amounts. Big sagebrush dominates the shrub layer at lower elevations of the zone. In general, overgrazing results in an increase in the abundance of unpalatable or weedy species at the expense of bluebunch wheatgrass. Dry sites are characterized by an open shrub layer with scattered rabbit-brush, antelope-brush south of Summerland, and the occasional big sagebrush. Bluebunch wheatgrass and the increaser, needle-and-thread grass, are commonly present. Py often grows on steep, rocky slopes or glaciofluvial terraces. Compact selaginella is the dominant herb on rock outcrops. Riparian sites are characterized by dense stands of At and Act with a shrubby understory containing red-osier dogwood, common snowberry and Nootka rose. Wetlands include either shrub-dominated sites with water birch, or saline meadows with alkali saltgrass.

Soils: The presence of thick (>10 cm), dark surface mineral soil horizons enriched with organic matter from decomposing grass roots characterizes BG zone soils. These soils are commonly Brown and Dark Brown Chernozems. Humus forms are typically thin Rhizomulls.

Subzones/Variants: Two subzones, the BGxh and BGxw, have been mapped in the KFR. The BGxh, or lower grassland, occurs below 700 m, in the valley bottoms of the southern Okanagan-Similkameen area, and the Thompson, Nicola and Fraser river systems. The BGxw, or middle grassland, which lacks the big sage commonly found in the lower grasslands, occurs south of Kamloops to Merritt. The BGxw also occurs along the Fraser River north of Big Bar Creek, and immediately north and east of Kamloops. Vegetative differences between the BGxw and BGxh are summarized in the table, Kamloops BG and IDF Grassland Vegetation.

Two variants of the BGxh are recognized in the KFR. The BGxh1 occurs at low elevations in the southern Okanagan and is distinguished by the presence of antelope-brush. The BGxh2 occupies the valley bottoms along the Thompson, Nicola and middle Fraser river systems.

Classification Features: Krajina (1969) grouped the lower and middle grassland areas with the lower-elevation dry ponderosa pine forests to form the Ponderosa Pine-Bunchgrass (PPBG) zone. Since then, the B.C. Ministry of Forests has subdivided the PPBG into separate BG and PP zones. Grassland communities in the IDF zone, recognized as grassland phases of the IDF, are distinguished from the BG communities both by elevation and by the presence of fescues and silky lupine. Grassland communities within the PP zone are recognized as distinct site units within that zone.

Kamloops BG and IDF Grassland Vegetation Table

	Subzone Phases	BG xh —	BG xw1 —	— IDF xha	— IDF dka	
Shrubs	*Artemisia tridentata*	▮▮▮▮▮				big sagebrush
	Artemisia frigida	▮	▮			pasture sage
	Chrysothamnus nauseosus	▮	▮			rabbit-brush
Herbs	*Agropyron spicatum*	▮▮▮▮▮	▮▮▮▮▮	▮▮▮▮▮	▮▮▮▮▮	bluebunch wheatgrass
	Poa sandbergii	▮	▮			Sandberg's bluegrass
	Koeleria macrantha		▮	▮	▮	junegrass
	Eriogonum heracleoides			▮		parsnip-flowered buckwheat
	Festuca idahoensis			▮▮	▮	Idaho fescue
	Achillea millefolium			▮	▮	yarrow
	Lupinus sericeus			▮	▮▮	silky lupine
	Poa pratensis			▮	▮▮▮	Kentucky bluegrass
	Festuca scabrella			▮▮▮	▮▮▮▮▮	rough fescue
Mosses & Lichens	*Cladonia* spp.	▮	▮	▮		lichens
	Tortula ruralis		▮			moss
	Ceratodon purpureus			▮		moss

Kamloops BG Environmental Characteristics

Biogeoclimatic Unit		BG xh1	BG xh2	BG xw1
Physical				
Area - hectares		61984	73917	86731
- percent of KFR		0.8	0.9	1.1
Elevation range (m)		250-700	250-700	330-1000
Soils				
Soil Classification[1]		B, DB	B, DB	DB, B
Humus Form[2]		ZL	ZL	ZL
Humus Depth (cm)	mean	1.6	0.5	0.7
	range	0-5	0-1	0-1
Soil pH	mean	—	7.2	6.9
Tree Species				
Climatic Climax		Non-forested	Non-forested	Non-forested
Other		Py, Fd, At, Act, Ep	Py, Fd, At, Act, Ep	Py, At, Fd

Kamloops BG Environmental Characteristics (cont'd)

Biogeoclimatic Unit		BG xh1	BG xh2	BG xw1
Climate				
Annual Precip. (mm)	mean	284	242	328
	range	242-336	193-281	160-458
Growing Season Precip. (mm)	mean	118	113	155
	range	103-128	96-132	79-225
Annual Snowfall (cm)	mean	68	75	100
	range	56-78	51-92	—
Annual Temp. (°C)	mean	9.2	8.4	5.8
	range	8.3-10.0	7.4-9.3	4.4-7.6
Growing Season Temp. (°C)	mean	17.6	17.8	14.4
	range	16.1-18.9	16.9-18.5	12.9-16.2
Mean Min. Jan. Temp. (°C)	mean	-6.0	-10.0	-11.8
	range	-6.9 – -5.3	-11.5 – -7.4	-13.5 – -10.3
Growing Degree Days (>5°C)	mean	2257	2269	1679
	range	1886-2513	2059-2440	1383-1990
Frost-Free Period (days)	mean	166	163	114
	range	138-186	143-192	79-143
Source of Clim. Data L/S/M/P [4]		8/1/0/0	5/0/4/0	1/0/6/0

Notes:

1. Canadian system of soil classification; see Appendix 6.
2. Klinka *et al*. 1981; see Appendix 7.
3. Site index-meters/100 years.
4. Normalized climatic data
   - L = long-term AES
   - S = short-term AES
   - M = MOE growing season data
   - P = predicted from elevational transect data

PONDEROSA PINE ZONE

Location and Distribution: The PP zone occurs at lower elevations in the very dry valleys of the southern Interior Plateau and in the Southern Rocky Mountain Trench in British Columbia. In the KFR, the zone occurs as a thin band along the lower valley sidewalls of the Fraser River in the Lytton-Lillooet area, the lower Thompson, Nicola and Similkameen rivers, and Okanagan Lake. Elevations range from 335 to 900 m. The zone extends from the U.S. border to 51°N latitude in British Columbia, but is much more extensive in eastern Washington and Oregon.

Climate: The PP is the driest and, in summer, the warmest forested zone in British Columbia. Winters are cool, with low snowfall. Detailed climate data are summarized in the table, PP Environmental Characteristics. The hot, dry summers result in large growing-season moisture deficits. Kelowna and Lytton have climates characteristic of the PP zone.

Vegetation: The forests of the PP landscape often consist of open, parkland stands with a Py canopy and an understory dominated by bluebunch wheatgrass. These stands are often interspersed with grassland communities. Fd is most common on moist and very moist sites, but also occurs as a minor component of drier sites in the northern part of the zone. Dense stands of At often occupy riparian or seepage sites. Ew and Ep are found locally on seepage sites, and Act occurs on floodplains.

Bluebunch wheatgrass and fescues dominate the understory on zonal sites. There are lesser amounts of arrow-leaved balsamroot, timber milk-vetch and yarrow. Drier sites are often grasslands. In good range condition, these sites are dominated by bluebunch wheatgrass, big sagebrush and fescues. On very moist to wet sites, young stands of Fd and At or Act occur. They have a shrubby understory containing water birch, common snowberry, roses, red-osier dogwood, tall Oregon-grape, Douglas maple and bluegrasses.

Soils: The dominant soils throughout the zone are Dark Brown Chernozems and Eutric Brunisols. There is local formation of saline or alkaline soils in depressions or basins with restricted drainage. Humus forms typically are Rhizomulls on zonal or drier sites, and Moders on zonal and wetter sites.

Subzones/Variants: Two subzones have been recognized in British Columbia. Only the PPxh, which is characterized by the presence of fescues, occurs in the KFR. The other subzone occurs in the Nelson Region.

Two variants of the PPxh are recognized. The PPxh1 occurs in the Okanagan Valley south of Vernon and along the Similkameen River. It is distinguished from the PPxh2 by the presence of Idaho fescue and a lower cover of Fd and rough fescue. The PPxh2 occurs in the Lytton-Lillooet area and along the Thompson and Nicola rivers.

Classification Features: Krajina (1969) grouped the lower and middle grassland areas with the lower and middle elevation dry forests to form the Ponderosa Pine-Bunchgrass (PPBG) zone. Since then, the B.C. Ministry of Forests has subdivided the PPBG into separate BG and PP zones, although small zonal grassland ecosystems occur within the PP zone. The PP is distinguished from the IDF zone by the dominance of Py and the presence of bluebunch wheatgrass on zonal ecosystems. The IDF has Fd and pinegrass.

Kamloops PP Environmental Characteristics

Biogeoclimatic Unit		PP xh1	PP xh2
Physical			
Area - hectares		114572	139983
- percent of KFR		1.4	1.7
Elevation range (m)		335-940	400-850
Soils			
Soil Classification[1]		DB, B	EB, B
Humus Form[2]		ZL, LD, RD	LD, RD, (ZL)
Humus Depth (cm)	mean	3.3	2.5
	range	1-5	2-6
Soil pH	mean	—	6.0
Tree Species			
Climatic Climax		Py ,(Fd)	Py, Fd
Other		At, Act	Act, Ep, At
Forest Productivity[3]			
Fd		18	19
Py		18	17

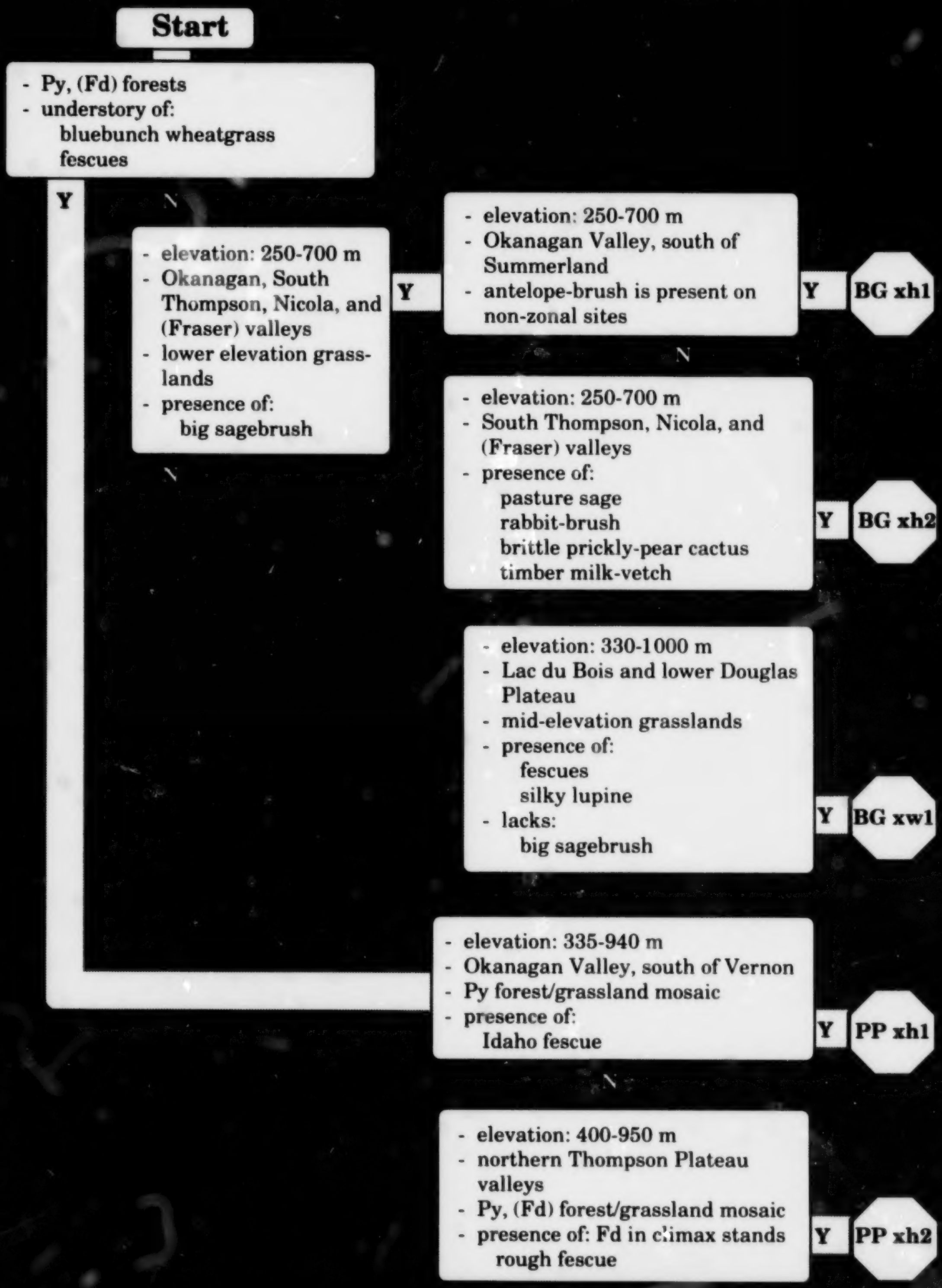
Kamloops PP Environmental Characteristics (cont'd)

Biogeoclimatic Unit		PP xh1	PP xh2
Climate			
Annual Precip. (mm)	mean	331	339
	range	258-390	287-391
Growing Season Precip. (mm)	mean	137	136
	range	105-162	94-175
Annual Snowfall (cm)	mean	102	92
	range	81-106	48-124
Annual Temp. (°C)	mean	8.2	7.3
	range	7.2-9.0	5.4-9.4
Growing Season Temp. (°C)	mean	16.2	16.3
	range	13.2-17.3	14.2-18.5
Mean Min. Jan. Temp. (°C)	mean	-6.9	-10.9
	range	-9.3 – -4.7	-12.8 – -8.2
Growing Degree Days (>5°C)	mean	1966	1929
	range	1416-2179	1545-2413
Frost-Free Period (days)	mean	146	130
	range	75-171	113-167
Source of Clim. Data L/S/M/P[4]		5/0/11/0	4/0/3/0

Notes:

1. Canadian system of soil classification; see Appendix 6.
2. Klinka *et al.* 1981; see Appendix 7.
3. Site index-meters/100 years.
4. Normalized climatic data
    L = long-term AES
    S = short-term AES
    M = MOE growing season data
    P = predicted from elevational transect data

Kamloops BG and PP Biogeoclimatic Keys[1]



- Py, (Fd) forests
- understory of:
  - bluebunch wheatgrass
  - fescues

- elevation: 250-700 m
- Okanagan, South Thompson, Nicola, and (Fraser) valleys
- lower elevation grasslands
- presence of:
  - big sagebrush

- elevation: 250-700 m
- Okanagan Valley, south of Summerland
- antelope-brush is present on non-zonal sites

- elevation: 250-700 m
- South Thompson, Nicola, and (Fraser) valleys
- presence of:
  - pasture sage
  - rabbit-brush
  - brittle prickly-pear cactus
  - timber milk-vetch

- elevation: 330-1000 m
- Lac du Bois and lower Douglas Plateau
- mid-elevation grasslands
- presence of:
  - fescues
  - silky lupine
- lacks:
  - big sagebrush

- elevation: 335-940 m
- Okanagan Valley, south of Vernon
- Py forest/grassland mosaic
- presence of:
  - Idaho fescue

- elevation: 400-950 m
- northern Thompson Plateau valleys
- Py, (Fd) forest/grassland mosaic
- presence of: Fd in climax stands
  - rough fescue

INTERIOR DOUGLAS-FIR ZONE

Location and Distribution: In British Columbia, the IDF dominates the low to mid-elevation landscape of the southern Interior Plateau and southern Rocky Mountain Trench, between 49°N and 52°N, and fingers into the leeward valleys of the Coast Mountains. Similar vegetation zones extend south into Washington, Oregon, Idaho and Montana. In the KFR, the IDF occurs in the very dry, dry, and wet belt transition climate regions (Figure 5), with the lowest elevations of the zone occurring between 350 and 850 m, and the upper elevations occurring between 1100 and 1450 m.

Climate: The IDF has a continental climate characterized by warm, dry summers, a relatively long growing season, and cool winters with a low to moderate snowfall. Detailed climate data are presented in the table, IDF Environmental Characteristics. Substantial moisture deficits occur throughout the growing season. Frosts are common throughout June and again in late August. Logan Lake and Princeton have climatic conditions characteristic of the IDF; Salmon Arm represents the moist end of the zone.

Vegetation: Much of the IDF landscape is occupied by mature forests of pure Fd. Where recent crown fires have occurred, mixed Fd and Pl, or Fd and Py, are common. Py occurs at lower elevations, usually on dry, south-facing slopes, but it may be a seral species on zonal sites at lower elevations within the zone. Pl, at high elevations, and At are widely distributed successional species. Sxw occurs throughout the zone, but is more common at higher elevations and on wet sites. Cw and Ep occur in the moist and wet subzones and on wet sites. Lw is restricted to areas east of Okanagan Lake.

The understory characteristically contains a moderate to high cover of pinegrass, with lesser amounts of birch-leaved spirea, heart-leaved arnica, soopolallie, falsebox, twinflower and kinnikinnick. Drier sites have an open canopy of Fd, with an understory dominated by bluebunch wheatgrass and lesser amounts of snowberry and saskatoon. Wetter sites have a canopy of Fd and Sxw, with a diverse understory containing black gooseberry, red-osier dogwood, black twinberry, prickly rose and numerous herbs.

A combination of edaphic and topographic conditions, and fire history, has led to the development of large grassland communities in parts of the IDF. Grasslands in good to excellent range condition are dominated by bluebunch wheatgrass and fescue. Other species such as junegrass, silky lupine and cheatgrass may dominate sites which have been over-grazed.

Soils: Zonal ecosystems typically occur on morainal deposits derived from basic volcanic bedrock. Soils are typically Orthic or Dark Gray Luvisols, and Eutric or Dystric Brunisols. Soils in the zone generally have medium to rich nutrient status, because of the predominance of base-rich bedrock and the low rates of leaching, a result of the dry climatic conditions. Humus forms are typically thin (2-5 cm) Hemimors and Mormoders.

Subzones/Variants: Seven IDF subzones are recognized in British Columbia. Six are mapped in the KFR; four of these (the IDFxh, IDFdk, IDFdm and IDFmw) are described in the guide. Zonal vegetation of these four subzones is summarized in the table, Kamloops IDF Subzonal Vegetation. The IDFxh1, which is located in the Okanagan and Similkameen valleys, has a poorly developed moss layer, Idaho fescue and snowbrush on drier south slopes, and more Py than the IDFxh2. The IDFxh2 occurs along the North and South Thompson rivers and in the Lytton-Lillooet area. The IDFdk occupies an elevational band above the IDFxh, occurring at low to mid-elevations of the southern Interior Plateau. The IDFdk1 occurs on the central and southern edge of the Thompson Plateau, while the IDFdk2, which is distinguished by the presence of falsebox and prince's pine, occurs on the lee side of the Cascade Mountains and the eastern edge of the Thompson Plateau. The IDFdk3 is concentrated to the north of the KFR on the Fraser Plateau, but also occurs in the upper Deadman Valley and the Camelsfoot Range, and north of Ashcroft. The IDFdk3 and IDFxw, which have a similar distribution in the KFR, are described in B.C. Ministry of Forests and Lands (1987). The IDFdm1, distinguished by the presence of Lw, occurs in the Okanagan Highlands and along the Kettle River. The IDFmw occupies a narrow transitional band between the wet and dry belts from east of Peachland through to Clearwater. The IDFmw2 is located north of the Shuswap lakes and is distinguished from the IDFmw1 by the lack of Lw. The IDFww has a limited distribution in the Lytton to Boston Bar area and the lower elevations around Anderson Lake. It has floristic affinities to the CWH and is described by Green *et al.* (1984).

Classification Features: The IDF is distinguished from the MS by a lack of Bl, Sxw and grouseberry and a higher cover of Fd. The warmer, drier lower elevation PP zone has bluebunch wheatgrass and lacks the Fd stands with a pinegrass-dominated understory that characterize the IDF. The ICH is distinguished from the IDFmw by the presence of Hw. The ICHmk lacks Hw, but can be recognized by the lack of pinegrass, tall Oregon grape and snowberry, and the presence of Sxw and Bl. Large grassland areas within the IDF are classified as grassland phases of the zone.

Kamloops IDF Subzonal Vegetation Table

	Subzones	xh	dk	dm	mw	
Trees	*Pinus ponderosa*	■				ponderosa pine
	Pseudotsuga menziesii var.*glauca*	■■■	■■■	■■■	■■■	interior Douglas-fir
	Pinus contorta		■■	■■	■	lodgepole pine
	Larix occidentalis			■		western larch
	Betula papyrifera				■	paper birch
	Thuja plicata				■	western redcedar
Shrubs	*Spiraea betulifolia*	■■	▮	▮	■	birch-leaved spirea
	Symphoricarpos albus	■			▮	common snowberry
	Mahonia aquifolium	▮		▮	▮	tall Oregon-grape
	Amelanchier alnifolia	▮		▮	▮	saskatoon
	Shepherdia canadensis		■	▮	▮	soopolallie
	Paxistima myrsinites		▮	▮	■■	falsebox
	Acer glabrum				▮	Douglas maple
	Rosa gymnocarpa				▮	baldhip rose
Herbs	*Calamagrostis rubescens*	■■■	■■■	■■■	▮	pinegrass
	Arnica cordifolia	▮	▮	▮		heart-leaved arnica
	Arctostaphylos uva-ursi		■	■		kinnikinnick
	Linnaea borealis		■	■	▮	twinflower
	Chimaphila umbellata		▮		■	prince's pine
Mosses	*Peltigera* spp.	▮	▮			lichens
	Pleurozium schreberi	▮	■	▮	■■	red-stemmed feathermoss

Kamloops IDF Environmental Characteristics

Biogeoclimatic Unit		IDF xh1	IDF xh2	IDF dk1	IDFdk2	IDF dm1	IDF mw1	IDF mw2
Physical								
Area - hectares		265575	339166	613912	442087	46952	104617	207559
- percent of KFR		3.3	4.2	7.6	5.5	0.6	1.3	2.6
Elevation range (m)		400-1250	850-1130	1130-1460	600-1300	560-1300	500-1200	335-1100
Soils								
Soil Classification[1]		GL, DYB, EB, MB	GL, DYB, EB, MB	GL, DYB, EB	DYB, GL, EB	DYB, EB, GL	DYB, EB, GL	GL, DYB, (EB)
Humus Form[2]		RD, LD, HR	LD, RD, HR	HR, RD	HR, RD	HR	HR, HUR	HR, HUR
Humus Depth (cm)	mean	3.8	4.2	4.3	4.0	3.7	4.5	4.3
	range	2-9	2-9	2-8	2-8	2-8	2-7	2-8
Soil pH	mean	5.6	5.4	5.5	5.3	5.6	5.7	5.9
Tree Species								
Climatic Climax		Fd	Fd	Fd	Fd	Fd	Fd, Cw	Fd, Cw
Other		Ep, Sxw, Act, At, Cw, Py	Sxw, Ep, Act, At, Cw, Py	At, Py, Sxw, Act, Pl	Sxw, Ep, Cw, Py, Act, Pl (Ep, Act)	Sxw, Py, At, Bl, Pl, Lw,	Sxw, Py, Act, Pl, Lw, Ep,	Sxw, Act, Pl Ep, At At
Forest Productivity[3]								
Cw		—	—	—	—	—	24	24
Fd		25	23	23	26	26	27	29
Lw		—	—	—	—	—	32	—
Pl		—	—	21	24	23	25	27
Py		25	—	19	—	—	—	—
Sxw		—	—	—	25	21	—	—

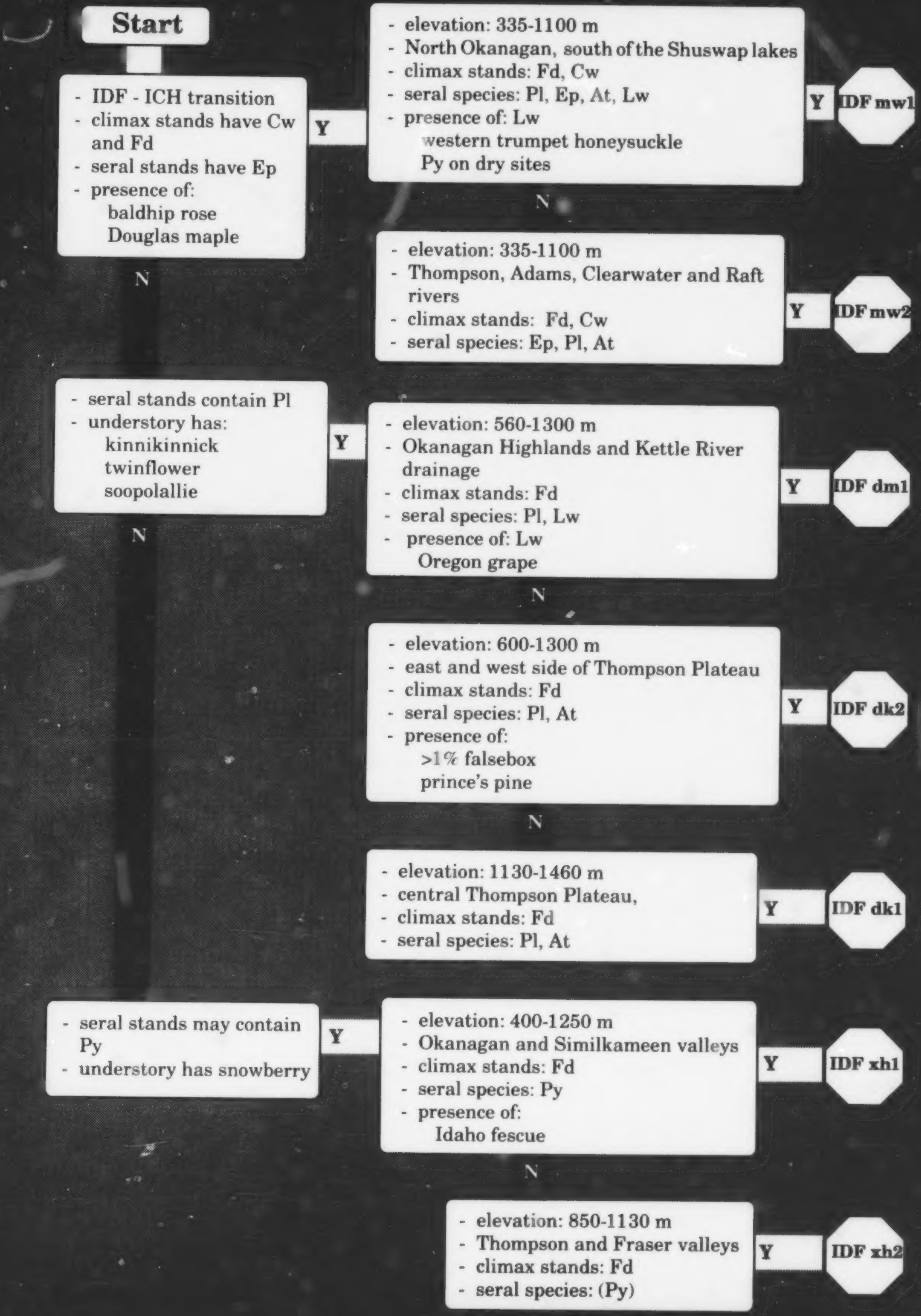
Kamloops IDF Environmental Characteristics (cont'd)

Biogeoclimatic Unit		IDF xh1	IDF xh2	IDFdk1	IDF dk2	IDF dm1	IDF mw1	IDF mw2[5]
Climate								
Annual Precip. (mm)	mean	407	379	438	568	505	515	521
	range	304-515	295-452	376-512	623-843	425-625	503-577	487-551
Growing Season Precip. (mm)	mean	166	185	193	221	169	224	207
	range	113-245	123-223	138-244	185-313	149-234	194-265	175-273
Annual Snowfall (cm)	mean	133	128	155	222	211	158	171
	range	82-170	93-150	178-264	178-264	145-379	130-195	137-202
Annual Temp. (°C)	mean	6.5	4.8	3.4	4.1	3.8	5.8	6.7
	range	4.1-7.9	3.4-6.6	1.5-4.4	2.5-5.9	4.2-7.6	4.3-6.8	4.2-7.6
Growing Season Temp. (°C)	mean	14.9	13.1	11.1	11.1	11.7	14.1	15.6
	range	12.3-16.6	10.8-14.8	9.7-12.7	9.7-13.4	11.1-12.2	12.3-15.6	14.5-16.3
Mean Min. Jan. Temp. (°C)	mean	-9.5	-13.4	-13.1	-11.9	-10.5	-10.9	-8.8
	range	-12.1 – -7.0	-16.4 – -11.8	-15.9 – -10.4	-13.5 – -10.6	—	-9.6 – -12.3	-11.6 – -7.5
Growing Degree Days (>5°C)	mean	1714	1429	1139	1133	1114	1556	1834
	range	1150-2053	1152-1768	862-1354	953-1266	1028-1199	1194-1861	1718-1933
Frost-Free Period (days)	mean	131	92	86	95	100	—	139
	range	101-156	50-135	52-132	62-132	84-116	—	131-149
Source of Clim. Data L/S/M/P[4]		11/1/7/0	5/4/4/0	0/2/12/0	2/3/3/0	1/3/3/0	4/0/1/0	5/0/0/0

Notes:

1. Canadian system of soil classification; see Appendix 6.
2. Klinka *et al*. 1981; see Appendix 7.
3. Site index-meters/100 years.
4. Normalized climatic data
   L = long-term AES
   S = short-term AES
   M = MOE growing season data
   P = predicted from elevational transect data
5. The high values for temperature can be attributed to the location of all climate stations in valley bottoms at the southern limits of the IDF mw2 distribution.

Kamloops IDF Biogeoclimatic Key[1]



Start

- IDF - ICH transition
- climax stands have Cw and Fd
- seral stands have Ep
- presence of:
  - baldhip rose
  - Douglas maple

Y

- elevation: 335-1100 m
- North Okanagan, south of the Shuswap lakes
- climax stands: Fd, Cw
- seral species: Pl, Ep, At, Lw
- presence of: Lw
  - western trumpet honeysuckle
  - Py on dry sites

Y **IDF mw1**

N

- elevation: 335-1100 m
- Thompson, Adams, Clearwater and Raft rivers
- climax stands: Fd, Cw
- seral species: Ep, Pl, At

Y **IDF mw2**

N

- seral stands contain Pl
- understory has:
  - kinnikinnick
  - twinflower
  - soopolallie

Y

- elevation: 560-1300 m
- Okanagan Highlands and Kettle River drainage
- climax stands: Fd
- seral species: Pl, Lw
- presence of: Lw
  - Oregon grape

Y **IDF dm1**

N

- elevation: 600-1300 m
- east and west side of Thompson Plateau
- climax stands: Fd
- seral species: Pl, At
- presence of:
  - >1% falsebox
  - prince's pine

Y **IDF dk2**

N

- elevation: 1130-1460 m
- central Thompson Plateau,
- climax stands: Fd
- seral species: Pl, At

Y **IDF dk1**

N

- seral stands may contain Py
- understory has snowberry

Y

- elevation: 400-1250 m
- Okanagan and Similkameen valleys
- climax stands: Fd
- seral species: Py
- presence of:
  - Idaho fescue

Y **IDF xh1**

N

- elevation: 850-1130 m
- Thompson and Fraser valleys
- climax stands: Fd
- seral species: (Py)

Y **IDF xh2**

MONTANE SPRUCE ZONE

Location and Distribution: The MS zone occurs at middle elevations of the southern Interior Plateau, the lee side of the Coast and Cascade mountains, and the southern Rocky Mountains and Rocky Mountain Trench. It extends from 53°N south to the U.S. border; closely related vegetation zones extend south into Washington, Idaho and Montana. In the KFR, the MS occurs at elevations between 1100 and 1600 m in the very dry and dry climatic regions (Figure 5). It occupies an elevational band above the IDF and below the ESSF. The climate, vegetation and soil characteristics of the MS are intermediate between these two zones.

Climate: The MS has a cool, continental climate characterized by cold winters and moderate snowfall, and moderately short, warm summers. Detailed climate data is summarized in the table, MS and SBS Environmental Characteristics. The growing season is sufficiently warm and dry that moisture deficits can occur, particularly in the drier subzones. Frost is common during the growing season, especially in late June and late August. Lac le Jeune, Knouff Lake and Brenda Mines, near Peachland, have climatic conditions characteristic of the MS.

Vegetation: Much of the MS landscape is occupied by young and maturing seral stands of Pl, or mixed Sxw, Bl and Pl stands. The major shade tolerant climax trees in the zone are Sxw and Bl. Other tree species that occur include Fd as a seral species on zonal ecosystems, or as a climax species on dry southern slopes, and Lw which occurs east of Okanagan Lake. At is common on moist, rich sites.

Understory vegetation on zonal sites characteristically includes: grouseberry, birch-leaved spirea, Utah honeysuckle, twinflower and one-sided wintergreen. Falsebox, black huckleberry and feathermosses are prevalent in wetter subzones. Pinegrass and arctic lupine are more dominant in drier units. On dry sites, Pl and Fd form open, mature stands. The understory frequently contains pinegrass, common juniper and kinnikinnick. Wet sites have a canopy of Sxw, Bl and Pl and an understory that generally contains black gooseberry and grouseberry. On very wet sites, common horsetails are prevalent.

Soils: Zonal and drier ecosystems have soils that are predominantly Dystric and Eutric Brunisols, although Orthic Gray Luvisols may occur. Humo-Ferric Podzols develop on coarser-textured deposits in wetter parts of the zone. Humus forms are commonly Hemimors and Hemihumimors, ranging from 3 to 12 cm in thickness.

Subzones/Variants: Five subzones have been recognized in British Columbia. Three of these occur in the KFR: the MSdc, MSdm and MSxc. The MSdc has a species-poor understory and lacks grouseberry and Utah honeysuckle. It occurs west and northwest of Lillooet. The MSxk, the driest subzone of the MS in the KFR, contains extensive fire-origin stands of Pl. It occurs at mid-elevations of the Thompson Plateau and is characterized by an understory dominated by pinegrass, grouseberry and feathermoss. The MSdm1 occurs in the Okanagan Highlands while the MSdm2 occurs on the lee side of the Cascade Mountains and on the east and northeast side of the Thompson Plateau. The MSdm is characterized by an understory containing black huckleberry, falsebox and feathermoss. The MSdm1 has Lw as a seral species. Lw is absent from the MSdm2.

Classification Features: The MS is a new zone formerly included in the ESSF (Krajina 1969). It is distinguished from the ESSF by the lack of white-flowered rhododendron and Sitka valerian, although the presence of Sxw, Bl and black huckleberry reflect its floristic affinities with the ESSF. The MS is distinguished from the IDF by the presence of Bl and Sxw. It has affinities to the IDF zone, as indicated in zonal ecosystems by the abundance of pinegrass and falsebox and the occasional presence of Fd. The MS is also floristically similar to the SBS, but its lower floristic diversity and more southerly distribution, and the presence of grouseberry and Utah honeysuckle distinguish the MS from the SBS.

Kamloops MS Subzonal Vegetation Table

	Subzones	xk	dm	dc	
Trees	*Pinus contorta*	▬	▬	■	lodgepole pine
	Picea engelmannii x glauca	■	■	■	hybrid white spruce
	Abies lasiocarpa		■	■	subalpine fir
	Pseudotsuga menziesii var.glauca		▮		interior Douglas-fir
	Thuja plicata				western redcedar
	Larix occidentalis				western larch
Shrubs	*Shepherdia canadensis*	▮			soopolallie
	Spiraea betulifolia		▮		birch-leaved spirea
	Lonicera utahensis	▮	▮		Utah honeysuckle
	Paxistima myrsinites		■		falsebox
	Vaccinium membranaceum		▮		black huckleberry
Herbs	*Fragaria virginiana*	▮			wild strawberry
	Arnica cordifolia	■			heart-leaved arnica
	Lupinus arcticus	■			arctic lupine
	Calamagrostis rubescens	▬	▮		pinegrass
	Vaccinium scoparium	▬	■		grouseberry
	Chimaphila umbellata	▮	▮		prince's pine
	Linnaea borealis	■	▮		twinflower
	Orthilia secunda	▮	▮	▮	one-sided wintergreen
	Cornus canadensis		▮		bunchberry
	Goodyera oblongifolia		▮		rattlesnake-plantain
Mosses	*Pleurozium schreberi*	■	▬	▮	red-stemmed feathermoss

Kamloops MS and SBS Environmental Characteristics

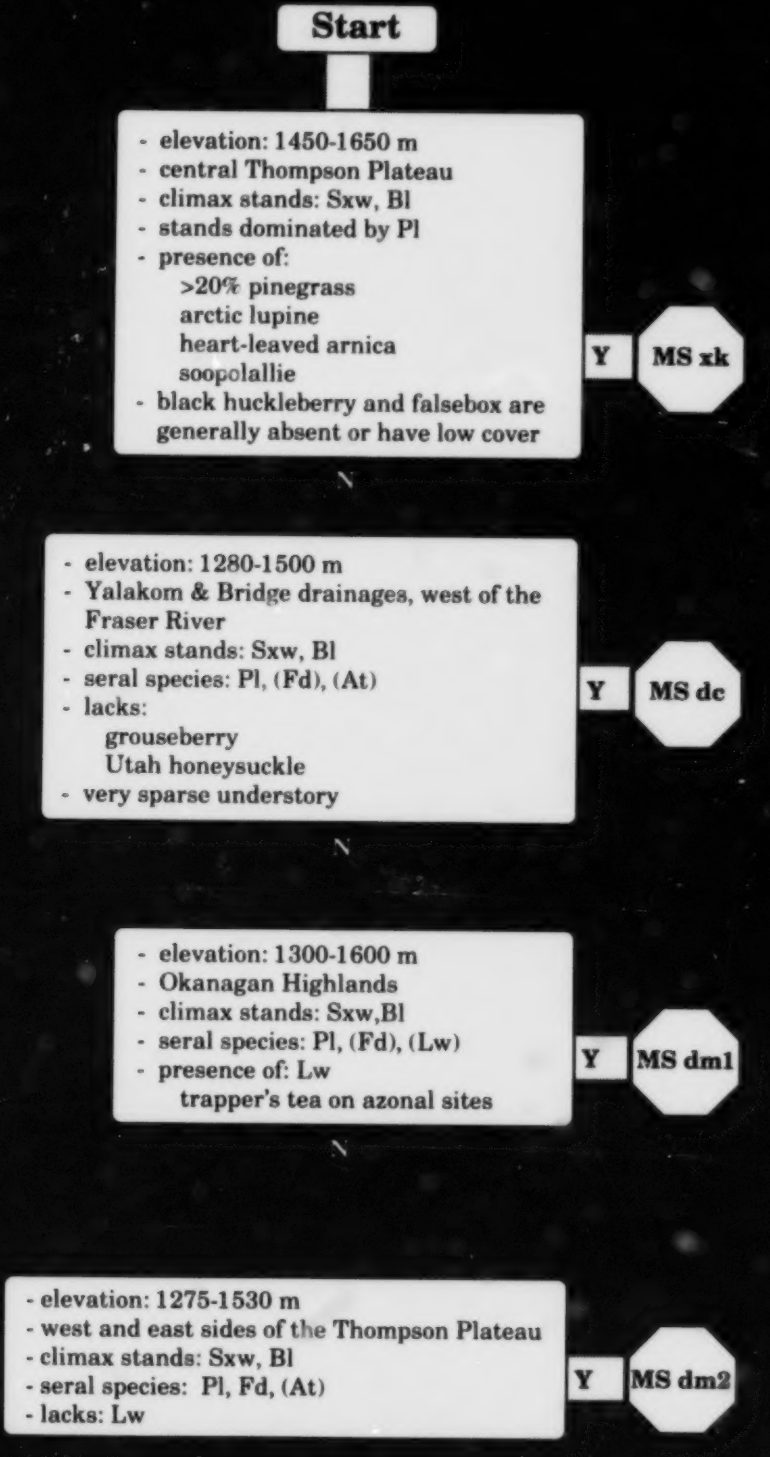
Biogeoclimatic Unit		MS dm1	MS dm2	MS dc	MS xk	SBS mm
Physical						
Area - hectares		82656	389753	49610	484966	61854
- percent of KFR		1.0	4.8	0.6	6.0	0.8
Elevation range (m)		1300-1600	1275-1530	1280-1500	1450-1650	1000-1450
Soils						
Soil Classification[1]		DYB, EB, GL, (HFP)	DYB, GL, HFP	DYB, EB	DYB, (GL)	HFP, GL, (DYB)
Humus Form[2]		HUR, HR	HUR, HR	HUR, HR	HUR, HR	HR, HUR
Humus Depth (cm)	range	3-12	3-13	3-11	1-10	4-6
Soil pH	mean	5.2	5.2	4.9	5.1	4.9
Tree Species						
Climatic Climax		Sxw, Bl	Sxw, Bl	Sxw, Bl	Sxw, Bl	Sxw, Bl
Other		Lw, Pl, (Fd, At)	Pl, Fd, At	Pl, Fd, At	Pl, At, Fd,	Pl, (At, Fd, Cw)
Forest Productivity[3]						
Bl		26	26	22	—	24
Cw		—	—	—	—	—
Fd		28	27	24	23	—
Lw		33	—	—	—	—
Pl		26	27	22	22	31
Sxw		26	26	22	21	27

Kamloops MS and SBS Environmental Characteristics (cont'd)

Biogeoclimatic Unit		MS dm1	MS dm2	MS dc	MS xk	SBS mm
Climate						
Annual Precip. (mm)	mean	638	606	831	444	No Data
	range	613-676	523-669	749-912	355-503	
Growing Season Precip. (mm)	mean	246	267	222	196	
	range	206-289	178-325	210-234	132-232	
Annual Snowfall (cm)	mean	311	307	—	206	
	range	—	216-398	—	205-207	
Annual Temp. (°C)	mean	3.2	2.8	2	3.1	
	range	—	0.9-5.4	0.6-3.4	1.7-5.0	
Growing Season Temp. (°C)	mean	10.4	10.2	10.8	11.1	
	range	9.3-11.4	9.1-11.1	10.1-11.5	10.4-11.6	
Mean Min. Jan. Temp. (°C)	mean	-13.6	-12.5	-15.7	-12.6	
	range	—	-16.4 – -9.3	-16.1 – -15.3	-13.9 – -11.3	
Growing Degree Days (>5°C)	mean	932	965	760	947	
	range	797-1056	856-1108	—	766-1054	
Frost-Free Period (days)	mean	29	85	68	55	
	range	20-45	63-103	53-83	22-94	
Source of Data L/S/M/P[4]		1/0/3/0	2/0/5/0	0/0/1/1	2/0/4/0	

Notes:
1. Canadian system of soil classification; see Appendix 6.
2. Klinka *et al.* 1981; see Appendix 7.
3. Site index-meters/100 years.
4. Normalized climatic data
   L = long-term AES
   S = short-term AES
   M = MOE growing season data
   P = predicted from elevational transect data

Kamloops MS Biogeoclimatic Key[1]



- elevation: 1450-1650 m
- central Thompson Plateau
- climax stands: Sxw, Bl
- stands dominated by Pl
- presence of:
  - >20% pinegrass
  - arctic lupine
  - heart-leaved arnica
  - soopolallie
- black huckleberry and falsebox are generally absent or have low cover

- elevation: 1280-1500 m
- Yalakom & Bridge drainages, west of the Fraser River
- climax stands: Sxw, Bl
- seral species: Pl, (Fd), (At)
- lacks:
  - grouseberry
  - Utah honeysuckle
- very sparse understory

- elevation: 1300-1600 m
- Okanagan Highlands
- climax stands: Sxw,Bl
- seral species: Pl, (Fd), (Lw)
- presence of: Lw
  - trapper's tea on azonal sites

- elevation: 1275-1530 m
- west and east sides of the Thompson Plateau
- climax stands: Sxw, Bl
- seral species: Pl, Fd, (At)
- lacks: Lw

SUB-BOREAL SPRUCE ZONE

Location and Distribution: The SBS zone dominates the low to mid-elevation landscapes of British Columbia's central interior. In the KFR, the SBS occurs primarily west of the North Thompson River, from Barriere to the Clearwater River, and also east of Vavenby. This represents the south-eastern extent of the zone. Elevations range from 1000 to 1450 m.

Climate: The SBS has a continental climate characterized by cold, snowy winters and relatively warm, moist, short summers. Moisture deficits are common, but of short duration. Frosts are common throughout the growing season. Prince George has a climate characteristic of the SBS.

Vegetation: The SBS landscape is occupied by mixed stands of Pl, Sxw and Bl. The dominant climatic climax trees are Sxw and Bl. Fd is a long-lived seral species, especially on warm, dry sites. At is a common seral species at lower elevations.

Understory vegetation on zonal sites includes black huckleberry, falsebox, twinflower, bunchberry, five-leaved bramble and stiff clubmoss. On dry sites, there are mature Pl stands with an understory containing soopolallie, falsebox, pinegrass, twinflower and prince's pine. Very moist sites have a canopy of Sxw and Bl with an understory dominated by oakfern, black gooseberry, black twinberry, one-leaved foamflower and five-leaved bramble. Horsetails are prevalent on wet sites, and very wet sites have sedge-dominated plant communities.

Soils: The most common soils on upland sites are Brunisolic Gray Luvisols, Humo-Ferric Podzols and Dystric Brunisols. Humus forms are commonly Hemimors and Hemihumimors, ranging from 4 to 8 cm in thickness.

Subzones: Ten subzones have been recognized in British Columbia. Three have been mapped in the KFR and one, the SBSmm, is described in detail in this guide. The SBSdw1, mapped along the boundary of the KFR between Mahood and Bonaparte lakes, is described in B.C. Ministry of Forests and Lands (1987). The SBSdh, which extends south of the Kamloops/Prince George regional boundary near Albreda, is described in Meidinger *et al.* 1984.

Classification Features: The SBS is closely aligned, vegetationally and environmentally, with the MS zone. The absence of grouseberry and Utah honeysuckle and its greater floristic diversity distinguish the SBS from the MS. The absence of white-flowered rhododendron, Sitka valerian and mountain arnica distinguishes the SBS from the ESSF.

Comment: Because of its close similarities with the MS zone and its limited areal extent in the KFR, summary tables for the SBS are included with the tables of the MS.

INTERIOR CEDAR - HEMLOCK ZONE

Location and Distribution: The ICH occupies the lower slopes of the Columbia Mountains and the western side of the Rocky Mountains between 49°N and 54°N in British Columbia, an area often referred to as the "Interior Wet-belt". The zone also occurs immediately east of the Coast Mountains in the Nass Basin and adjacent areas in the Hazelton and Skeena mountains of west-central British Columbia. Similar vegetation zones extend south of the province into eastern Washington, Idaho and western Montana. In the KFR, the ICH occurs at low to middle elevations in the wet and very wet climate regions (Figure 5), extending from the Upper Kettle River through to the north end of Wells Gray Park. Elevations range from 660 to 1400 m.

Climate: The ICH has a continental climate dominated by easterly moving air masses, resulting in cool, wet winters and warm, moderately dry summers. Snowfall is moderate to high. Detailed climate data is given in the table, ICH Environmental Characteristics. Late snow melt and evenly distributed rainfall minimize summer soil moisture deficits. Frost occurrences during the summer are uncommon. The ICH has the most suitable climate for tree growth in the Interior. Sicamous, Mabel Lake and Blue River have climates characteristic of moist to wet ICH subzones.

Vegetation: Climax stands of Cw and Hw dominate wet and very wet subzones, whereas in moist subzones, successional stands are interspersed with the climax forests. Sxw and Bl are common and may form part of climax stands, especially in cold air pockets or at higher elevations. Fd, Pl, At and Ep are common seral species throughout the zone. Lw occurs south of Shuswap Lake. Act is common on wet ecosystems. The ICH has the greatest diversity of tree species of any zone in British Columbia.

Understory vegetation on zonal sites characteristically includes black huckleberry, queen's cup, bunchberry and twinflower. In dry and moist subzones, feathermosses dominate the understory; in wet subzones, the herb or herb-moss dominated understory contains, oak fern, one-leaved foamflower, rosy twistedstalk and five-leaved bramble. On xeric to subxeric sites of drier subzones, southern exposures have climax stands containing Fd and Cw; Pl may form mature seral stands with an understory containing pinegrass. Wet sites have a canopy of Cw and Hw, with a minor component of Sxw and Bl and a diverse understory typically including devil's club, black gooseberry, oval-leaved blueberry, oak fern, lady fern, one-leaved foamflower and five-leaved bramble. Skunk cabbage characteristically occurs on very wet sites.

Soils: On zonal ecosystems, Humo-Ferric Podzols are the dominant soil type. Dystric Brunisols and Brunisolic Gray Luvisols also occur in moist subzones, and Ferro-Humic Podzols occur in the wetter subzones. Humus forms are commonly Hemihumimors and Hemimors, ranging from 3 to 15 cm in thickness.

Subzones/Variants: Ten ICH subzones have been recognized in British Columbia. Four of these are mapped in the KFR. The ICHmk has a limited distribution and occurs at mid-elevations along the wet-belt transition. It represents a broad transition between the MS or SBS and ICH, as indicated by the presence of Cw, Sxw and Bl, and the absence of Hw. The more southerly ICHmk1 is distinguished from the ICHmk2 by the occurrence of Lw, grouseberry and Utah honeysuckle. The ICHmw, with a moss-dominated understory, and the ICHwk1, with an herb-rich understory, occur in the Shuswap and Quesnel highlands from east of Vernon through to the Prince George region. The ICHvk1, with a devil's club-fern dominated understory generally occurs as an elevational band above the ICHwk1 on the Columbia and Cariboo mountain valleys.

Classification Features: The ICH is distinguished for other interior zones by the presence of Cw/Hw or Cw/Sxw/Bl climax forests. The presence of Pw in seral stands and skunk cabbage on wet sites is also useful in defining the ICH. The ICHc from the Nelson region and the MSb3 (MSmm) from the Kamloops region have been combined to form the ICHmk1.

Kamloops ICH Subzonal Vegetation Table

	Subzones	ICHmk	ICHmw	ICHwk	ICHvk	
Trees	*Abies lasiocarpa*	■■				subalpine fir
	Pinus contorta	■■				lodgepole pine
	Pseudotsuga menziesii var.*glauca*	■	■			interior Douglas-fir
	Pinus monticola		▮			western white pine
	Picea engelmannii x glauca	■■			■	hybrid white spruce
	Thuja plicata	■■	■■■	■■■	■■■	western redcedar
	Tsuga heterophylla		■■■	■■■	■■	western hemlock
Shrubs	*Paxistima myrsinites*	■■	■	▮		falsebox
	Vaccinium membranaceum	▮	▮	▮	▮	black huckleberry
	Vaccinium ovalifolium			▮	▮	oval-leaved blueberry
	Oplopanax horridus				■■■	devil's club
Herbs	*Chimaphila umbellata*	▮	▮			prince's pine
	Goodyera oblongifolia	▮	▮	▮		rattlesnake-plantain
	Linnaea borealis	▮	▮	▮		twinflower
	Cornus canadensis	▮	▮	■		bunchberry
	Clintonia uniflora	▮	▮	■	▮	queen's cup
	Rubus pedatus			▮	▮	five-leaved bramble
	Streptopus roseus			▮	▮	rosy twistedstalk
	Tiarella unifoliata			■	■■	one-leaved foamflower
	Gymnocarpium dryopteris			■■	■■	oak fern
	Circaea alpina				▮	enchanter's nightshade
	Galium triflorum				▮	sweet-scented bedstraw
	Dryopteris assimilis				■■	spiny wood fern
	Athyrium filix-femina				■■	lady fern
Mosses	*Pleurozium schreberi*	■■	■■■	■■■		red-stemmed feathermoss
	Ptilium crista-castrensis	■	▮	■		knight's plume
	Hylocomium splendens		■■	■■■		step moss
	Rhytidiopsis robusta		■	■	▮	pipecleaner moss
	Mnium spp.			▮	■■	leafy mosses

Kamloops ICH Environmental Characteristics

Biogeoclimatic Unit		ICHmk1	ICH mk2	ICH mw2	ICH mw3	ICH wk1	ICH vk1
Physical							
Area - hectares		75029	45031	225353	482231	286434	78666
- percent of KFR		0.9	0.5	2.8	6.0	3.4	1.0
Elevation range (m)		1100-1500	975-1450	400-1450	400-1400	650-1375	900-1280
Soils							
Soil Classification[1]		DYB, GL, HFP	HFP, DYB, GL	HFP, DYB	HFP, GL, DYB	HFP, FHP	HFP, FHP
Humus Form[2]		HUR, (HR)	HR, HUR	HUR, HR	HUR, HR	HUR, HR	HUR, HR, UR
Humus Depth (cm)	mean	5.8	—	7.6	6.5	6.1	8.4
	range	3-13	—	3-14	3-18	3-12	2-16
Soil pH	mean	5.2	—	4.8	4.9	4.5	4.9
Tree Species							
Climatic Climax		Cw, Sxw, Bl	Cw, Bl, (Sxw)	Hw, Cw	Hw, Cw	Hw, Cw, (Bl)	Cw, Hw, (Bl)
Other		Pl, Lw, At, Fd, (Ep)	Fd, Pl, Ep, At	Fd, Pw, Lw, Ep, At, Sxw, Bl, Pl, Act	Fd, Pw, Pl, At, Ep, Sxw, Bl, Act	Sxw, Pw, Fd, Ep, Pl, Act	Sxw, Bl, (Pw, Fd, Ep, Act)
Forest Productivity[3]							
Bl		29	No Data	—	27	25	30
Cw		23		24	23	25	27
Fd		28		31	32	35	—
Hw		—		25	25	25	27
Lw		34		36	—	—	—
Sxw		29		31	31	33	32

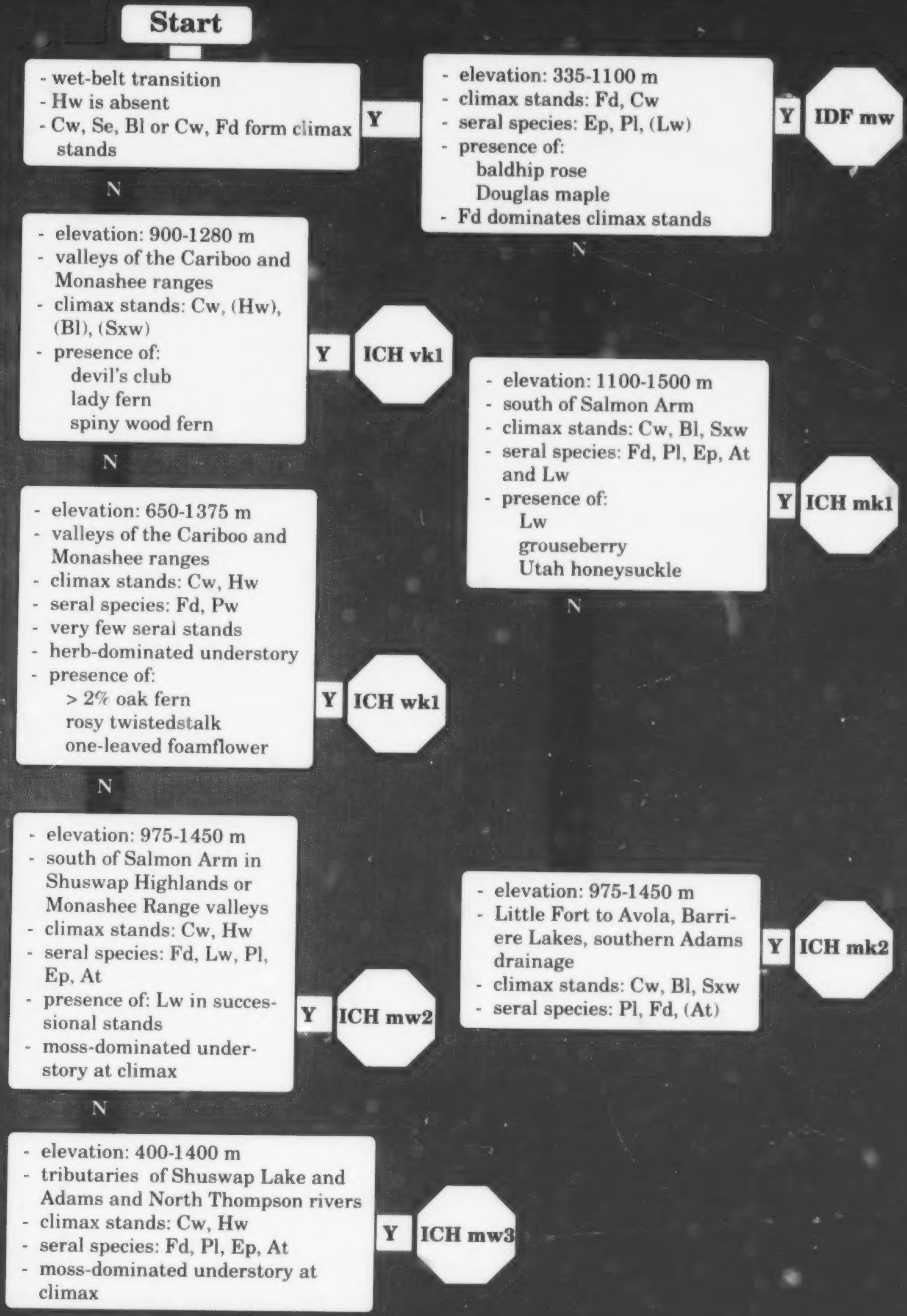
Kamloops ICH Environmental Characteristics

Biogeoclimatic Unit		ICHmk1	ICH mk2	ICH mw2	ICH mw3	ICH wk1	ICH vk1
Climate							
Annual Precip. (mm)	**mean**	**665**	No Data	**656**	**671**	**1044**	**1560**
	range	**663-669**		**598-810**	**431-874**	**868-1200**	**1419-1724**
Growing Season Precip. (mm)	**mean**	**234**		**243**	**292**	**377**	**380**
	range	**221-252**		**194-295**	**208-368**	**325-439**	**331-461**
Annual Snowfall (cm)	**mean**	**432**		**208**	**252**	**423**	**918**
	range	**365-500**		**184-259**	**211-287**	**374-464**	**734-1091**
Annual Temp. (°C)	**mean**	**2.8**		**7.5**	**5.3**	**5.0**	**3.3**
	range	**2.5-3.0**		**7.3-7.8**	**3.7-6.9**	**4.1-6.9**	**2.1-4.4**
Growing Season Temp. (°C)	**mean**	**10.9**		**15.6**	**13.8**	**14.0**	**12.2**
	range	**10.4-11.4**		**14.6-16.7**	**12.2-17.0**	**13.1-15.8**	**11.0-13.6**
Mean Min. Jan. Temp. (°C)	**mean**	**-13.6**		**-6.9**	**-11.6**	**-12.8**	**-13.1**
	range	—		**-1.8 – -7.2**	—	**-9.2 – -15.8**	—
Growing Degree Days (>5°C)	**mean**	**891**		**1802**	**1626**	**1489**	**1189**
	range	—		**1649-1932**	**1137-1987**	**1298-1809**	**991-1387**
Frost-Free Period (days)	**mean**	—		**130**	**127**	**110**	**89**
	range	—		**84-169**	**103-154**	**107-140**	—
Source of Clim. Data L/S/M/P[4]		**1/1/1/0**		**5/0/0/0**	**3/0/14/0**	**3/0/0/0**	**3/1/1/0**

Notes:

1. Canadian system of soil classification; see Appendix 6.
2. Klinka *et al.* 1981; see Appendix 7.
3. Site index-meters/100 years.
4. Normalized climatic data
   L=long-term AES
   S=short-term AES
   M=MOE growing season data
   P=predicted from elevational transect data

Kamloops ICH Biogeoclimatic Key[1]



Start

- wet-belt transition
- Hw is absent
- Cw, Se, Bl or Cw, Fd form climax stands

Y

- elevation: 335-1100 m
- climax stands: Fd, Cw
- seral species: Ep, Pl, (Lw)
- presence of:
  - baldhip rose
  - Douglas maple
- Fd dominates climax stands

Y **IDF mw**

N

- elevation: 1100-1500 m
- south of Salmon Arm
- climax stands: Cw, Bl, Sxw
- seral species: Fd, Pl, Ep, At and Lw
- presence of:
  - Lw
  - grouseberry
  - Utah honeysuckle

Y **ICH mk1**

N

- elevation: 975-1450 m
- Little Fort to Avola, Barriere Lakes, southern Adams drainage
- climax stands: Cw, Bl, Sxw
- seral species: Pl, Fd, (At)

Y **ICH mk2**

N

- elevation: 900-1280 m
- valleys of the Cariboo and Monashee ranges
- climax stands: Cw, (Hw), (Bl), (Sxw)
- presence of:
  - devil's club
  - lady fern
  - spiny wood fern

Y **ICH vk1**

N

- elevation: 650-1375 m
- valleys of the Cariboo and Monashee ranges
- climax stands: Cw, Hw
- seral species: Fd, Pw
- very few seral stands
- herb-dominated understory
- presence of:
  - > 2% oak fern
  - rosy twistedstalk
  - one-leaved foamflower

Y **ICH wk1**

N

- elevation: 975-1450 m
- south of Salmon Arm in Shuswap Highlands or Monashee Range valleys
- climax stands: Cw, Hw
- seral species: Fd, Lw, Pl, Ep, At
- presence of: Lw in successional stands
- moss-dominated understory at climax

Y **ICH mw2**

N

- elevation: 400-1400 m
- tributaries of Shuswap Lake and Adams and North Thompson rivers
- climax stands: Cw, Hw
- seral species: Fd, Pl, Ep, At
- moss-dominated understory at climax

Y **ICH mw3**

ENGELMANN SPRUCE – SUBALPINE FIR ZONE

Location and Distribution: The ESSF zone is the highest elevation forested zone in the southern and central interior of British Columbia. In the KFR, it occurs from the United States border to the northern regional boundary, and from the Coast Range to the Monashees. Elevations range from 1275 to 2050 m. Similar vegetation communities occur in Washington, Oregon, Idaho and Montana. The ESSF occurs above the ICH, MS and SBS zones in the KFR.

Climate: The ESSF has a continental climate characterized by long, cold winters with a high snowcover, and short, cool summers. Detailed climatic information is summarized in the table, ESSF Environmental Characteristics. Much of the snow pack, which reaches a maximum depth of 1-4 m, characteristically remains until late May. Frosts are common and moisture deficits uncommon during the growing season.

Vegetation: Mature forests containing the climax species Se and Bl cover much of the ESSF landscape. In drier areas, Pl is often a major component of mature forests. Ba and Hm occur in the Coast Mountains; Hm is also found in very wet subzones in the Monashee Range. Pa occurs on dry sites primarily on the leeward slopes of the Coast Range. Deciduous tree species are uncommon in the ESSF. The ESSF consists of continuous forest at its lower and middle elevations, and subalpine parkland at its upper elevations. In the parkland, trees occur as clumps associated with areas of heath, meadow and grassland. Snow avalanche tracks are very common in high-snowfall, mountainous areas of the ESSF. These tracks are usually occupied by a tangled mass of tall shrubs and herbaceous species, dominated by Sitka alder.

On zonal sites, the understory vegetation characteristically includes black huckleberry and white-flowered rhododendron. Five-leaved bramble is present in all except the very dry subzones. Grouseberry is present in the drier subzones, and oval-leaved blueberry, false azalea and oak fern are found in the wet subzones. Dry sites in the dry and moist subzones have Pl, common juniper, pinegrass and grouseberry; those in the wet subzones have Bl, Se and black huckleberry. Wet sites have a Se, Bl canopy and a mixed shrub-herb understory. Horsetails and groundsel commonly occur on very wet sites.

Soils: Soils on dry to moist sites are commonly Humo-Ferric Podzols or Dystric Brunisols. Ferro-Humic Podzols or Sombric Brunisols may occur in the wet subzones. Mineral soils in the ESSF are commonly strongly leached and acidic. Humus forms are generally Hemimors, Hemihumimors and Humimors, and range in thickness from 2 to 20 cm.

Subzones/Variants: Fourteen subzones of the ESSF have been recognized in B.C. Eight of these subzones are mapped in the KFR; seven are described in this guide. The ESSFmw occurs along the western boundary of the KFR, on the lee side of the Coast and Cascade mountains. and is distinguished by the occurence of Hm and Ba. The ESSFdv occurs west of Lytton-Lillooet, in the lower Stein, Cayoosh, Bridge and southern Yalakom drainages. The ESSFdc occurs on the southwestern, eastern and northern edges of the Thompson Plateau. The wetter ESSFwc is distinguished from the ESSFdc by the presence of false azalea, oak fern and rosy twistedstalk. The ESSFwc2 occurs in the wet belt on the Shuswap Highlands. The ESSFvc has Hm, and occurs on the west side of the Monashee Mountains from the upper Seymour River to just south of Revelstoke. The ESSFvv occupies a high-elevation band above the ESSFwc2 and ESSFvc on the Monashee and Cariboo mountains, from east of Lumby to the north end of the KFR.

Classification Features: Many of the low elevation areas of the Thompson Plateau that were originally classified by Krajina (1969) as ESSF are now included in the MS zone. The ESSF is distinguished from the MS and SBS by the presence of white-flowered rhododendron and Sitka valerian.

Kamloops ESSF Subzonal Vegetation Table

	Subzones	ESSFxc	ESSFdc	ESSFdv	ESSFmw	ESSFwc	ESSFvc	ESSFvv	
Trees	*Abies lasiocarpa*	███	███	███	███	███	██	███	subalpine fir
	Picea engelmannii	██	██	██	███	██	██	█	Engelmann spruce
	Pinus contorta	▌	▌	▌	▌				lodgepole pine
	Abies amabilis				██				amabilis fir
	Tsuga mertensiana				▌		█		mountain hemlock
Shrubs	*Vaccinium membranaceum*	▌	██	██	██	██	███	███	black huckleberry
	Rhododendron albiflorum		███	███	██	███	██	███	white-flowered rhododendron
	Vaccinium ovalifolium				▌	▌	██		oval-leaved blueberry
	Menziesia ferruginea				▌	██	██		false azalea
Herbs	*Vaccinium scoparium*	███	██		▌				grouseberry
	Rubus pedatus	██	▌		▌	█	██		five-leaved bramble
	Arnica latifolia	█	▌			▌		█	mountain arnica
	Valeriana sitchensis	██	▌		▌	██	█	██	Sitka valerian
	Gymnocarpium dryopteris					██	██		oak fern
	Veratrum viride					▌	▌	▌	Indian hellebore
	Tiarella unifoliata					█	█	▌	one-leaved foamflower
	Streptopus roseus					█	█	▌	rosy twistedstalk
	Athyrium filix-femina						▌		lady fern
	Luzula parviflora						▌		small-flowered woodrush
	Dryopteris assimilis						█		spiny wood fern
	Vahlodea atropurpurea							▌	mountain hairgrass
	Mitella breweri							▌	Brewer's mitrewort
Mosses & Liverworts	*Pleurozium schreberi*	▌	██	██	█	█	█		red-stemmed feathermoss
	Rhytidiopsis robusta				█	▌			pipecleaner moss
	Mnium spp.					▌	█		leafy mosses
	Brachythecium spp.	█				▌	█	▌	mosses
	Barbilophozia spp.		█	▌		▌	█	█	liverworts
	Dicranum fuscesens	▌		▌			▌		curly heron's-bill moss

Kamloops ESSF Environmental Characteristics

Biogeoclimatic Unit		ESSF xc	ESSF dc1	ESSF dc2	ESSF dv	ESSF mw	ESSF wc2	ESSF vc	ESSF vv[5]
Physical									
Area - hectares		298243	77499	204070	127926	132628	759762	66452	not mapped
- percent of KFR		3.7	1.0	2.5	1.6	1.6	9.4	0.8	—
Elevation range (m)		1650-2060	1600-1950	1520-1900	1500-1900	1275-1675	1400-1700	1280-1620	1640-1890
Soils									
Soil Classification[1]		HFP, DYB, SB	HFP, DYB	HFP, DYB	HFP, DYB	HFP	HFP, DYB, SB, FHP	HFP, FHP, DYB, SB	HFP, DYB, SB, FHP
Humus Form[2]		HR, HUR, (UR)	HR, (HUR)	HR, HUR	HR, HUR	HUR, HR	HUR, UR, HR	HUR, HR	HUR, UR
Humus Depth	mean	4.5	5.6	5.2	5.7	7.3	6.8	5.5	2.8
	range	2-10	2-12	2-6	2-14	2-20	3-16	2-10	2-4
Soil pH	mean	—	4.4	4.9	4.4	4.5	4.4	4.4	4.4
Tree Species									
Climatic Climax		Se, Bl	Se, Bl	Se, Bl	Se, Bl	Se, Bl, Ba,	Se, Bl, Hm	Se, Bl, Hm	Bl, (Se, Hm)
Other		Pl, (Pa)	Pl	Pl, (Pa)	Pl, Pa	Pl, (Pa, Fd, Pw)	(Pl)	—	(Pa)
Forest Productivity[3]									
Ba		—	—	—	—	23	—	—	—
Bl		17	15	18	17	22	22	21	20
Hm		—	—	—	—	—	—	20	—
Pl		18	22	24	20	25	—	—	—
Se		17	19	20	20	24	25	28	20

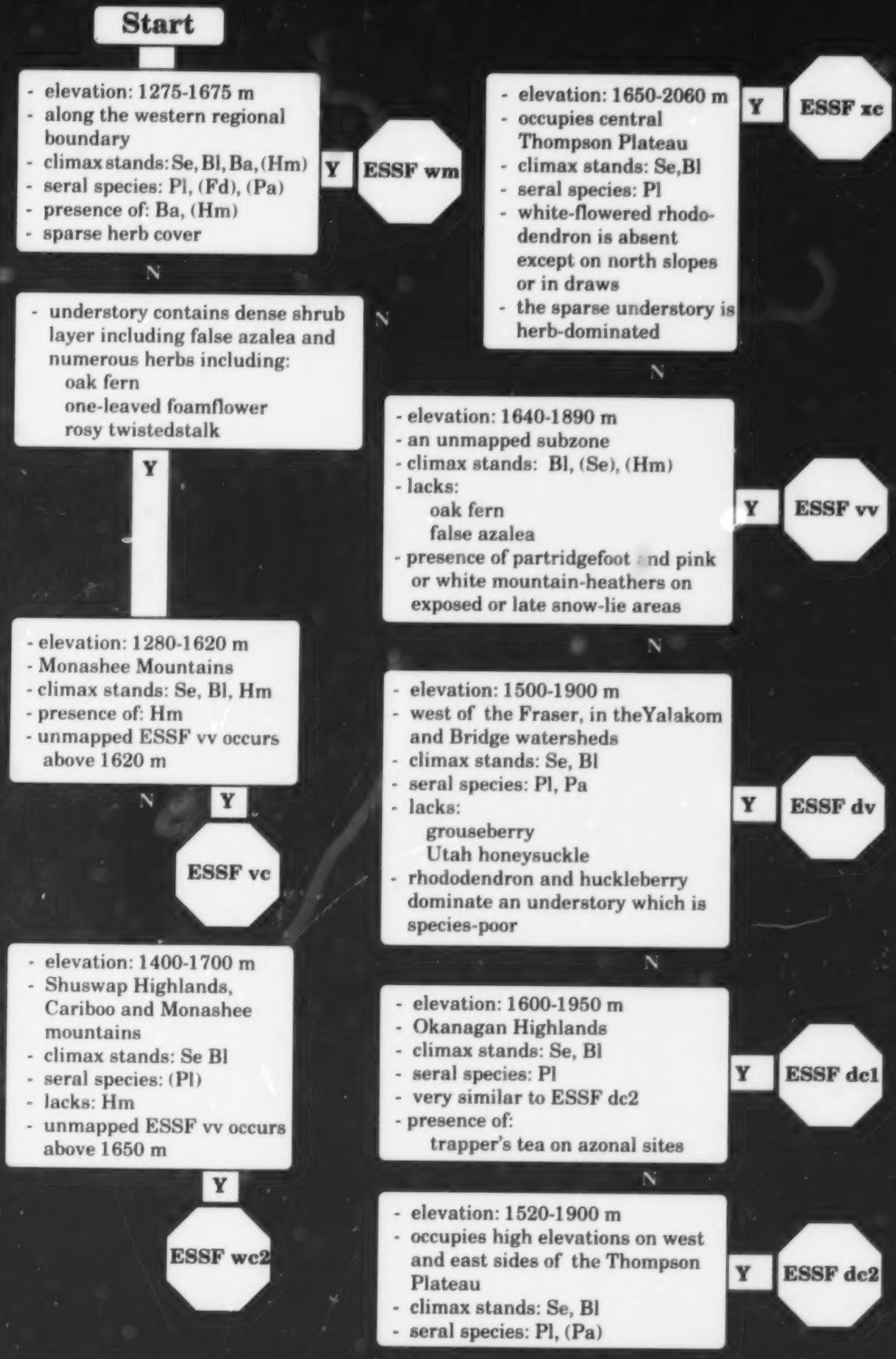
Kamloops ESSF Environmental Characteristics (cont'd)

Biogeoclimatic Unit		ESSF xc	ESSF dc1	ESSF dc2	ESSF dv	ESSF mw	ESSF wc2	ESSF vc	ESSF vv[5]
Climate									
Annual Precip. (mm)	mean	565	—	839	766	1820	1177	2268	No Data
	range	514-693	—	724-1029	599-934	885-2452	—	2134-2402	
Growing Season Precip. (mm)	mean	233	261	296	251	345	361	559	
	range	205-249	243-278	258-355	240-261	247-469	328-402	530-587	
Annual Snowfall (cm)	mean	321	635	—	—	726	782	1873	
	range	247-385	—	—	—	—	—	1662-2083	
Annual Temp. (°C)	mean	1.7	2.0	-0.2	-0.9	2.5	1.1	-0.3	
	range	0.8-2.6	—	-2.1	—	1-4	—	-0.4	
Growing Season Temp. (°C)	mean	9.3	10.2	8.0	7.9	10	11.6	7.5	
	range	7.8-11.0	9.9-10.4	7.1-9.2	7.1-8.7	9-11	9.0-14.1	7.1-7.8	
Mean Min. Jan. Temp. (°C)	mean	-11.6	—	-14.1	-14.9	-9.0	-13.8	—	
	range	-12.3 – -10.9	—	-16.1 – -13.1	-17.0 – -12.7	-12 – -7	—	—	
Growing Degree Days (>5°C)	mean	764	—	579	663	956	672	—	
	range	651-842	—	471-639	582-743	716-1168	—	—	
Frost-Free Period (days)	mean	45	—	—	9	47	—	—	
	range	9-66	—	—	8-9	31-50	—	—	
Source of Clim. Data L/S/M/P[4]		2/0/3/2	0/1/1/0	0/0/0/3	0/0/0/2	1/1/0/2	1/0/2/0	0/2/0/0	

Notes:

1. Canadian system of soil classification; see Appendix 6.
2. Klinka *et al.* 1981; see Appendix 7.
3. Site index-meters/100 years.
4. Normalized climatic data
    L=long-term AES
    S=short-term AES
    M=MOE growing season data
    P=predicted from elevational transect data

Kamloops ESSF Biogeoclimatic Key[1]



Start

- elevation: 1275-1675 m
- along the western regional boundary
- climax stands: Se, Bl, Ba, (Hm)
- seral species: Pl, (Fd), (Pa)
- presence of: Ba, (Hm)
- sparse herb cover

Y **ESSF wm**

N

- understory contains dense shrub layer including false azalea and numerous herbs including:
  - oak fern
  - one-leaved foamflower
  - rosy twistedstalk

Y

- elevation: 1280-1620 m
- Monashee Mountains
- climax stands: Se, Bl, Hm
- presence of: Hm
- unmapped ESSF vv occurs above 1620 m

Y **ESSF vc**

N

- elevation: 1400-1700 m
- Shuswap Highlands, Cariboo and Monashee mountains
- climax stands: Se Bl
- seral species: (Pl)
- lacks: Hm
- unmapped ESSF vv occurs above 1650 m

Y **ESSF wc2**

N

- elevation: 1650-2060 m
- occupies central Thompson Plateau
- climax stands: Se,Bl
- seral species: Pl
- white-flowered rhododendron is absent except on north slopes or in draws
- the sparse understory is herb-dominated

Y **ESSF xc**

N

- elevation: 1640-1890 m
- an unmapped subzone
- climax stands: Bl, (Se), (Hm)
- lacks:
  - oak fern
  - false azalea
- presence of partridgefoot and pink or white mountain-heathers on exposed or late snow-lie areas

Y **ESSF vv**

N

- elevation: 1500-1900 m
- west of the Fraser, in theYalakom and Bridge watersheds
- climax stands: Se, Bl
- seral species: Pl, Pa
- lacks:
  - grouseberry
  - Utah honeysuckle
- rhododendron and huckleberry dominate an understory which is species-poor

Y **ESSF dv**

N

- elevation: 1600-1950 m
- Okanagan Highlands
- climax stands: Se, Bl
- seral species: Pl
- very similar to ESSF dc2
- presence of:
  - trapper's tea on azonal sites

Y **ESSF dc1**

N

- elevation: 1520-1900 m
- occupies high elevations on west and east sides of the Thompson Plateau
- climax stands: Se, Bl
- seral species: Pl, (Pa)

Y **ESSF dc2**

ALPINE TUNDRA ZONE

Location and Distribution: The AT zone occurs on high mountains throughout British Columbia. In the KFR, the zone chiefly occurs along the western boundary in the Coast and Cascade mountains, and in the east and northeast along the Columbia Mountains. Isolated areas occur across the southern Interior Plateau where mountains are sufficiently high. The zone starts at an elevation of approximately 1700 m along the Coast Mountains, and approximately 2000 m in the southern Interior.

Climate: The alpine climate is extremely harsh, with very cold, long and snowy winters and cold, windy summers. Approximately 70-80% of the precipitation falls as snow. Growing season temperatures are very low and there is a very short frost-free period, with frosts occurring on any day during the growing season.

Vegetation: Alpine vegetation is dominated by low shrubs, herbs, mosses and lichens. Much of the AT landscape lacks a vegetative cover, and exposed minera soil, rock, ice, and snowcover the surface. At lower elevations, trees are occasionally present in a stunted or krummholz form. The most common tree species are subalpine fir and Engelmann spruce.

In alpine areas, small changes in topographic relief can result in significant changes in soil temperature, rates of snow accumulation and depletion, wind, and resultant vegetation development. AT ecosystems have not been studied in detail, but a summary of known information was completed by Hamilton (1983) and is included for completeness:

	Alpine Vegetation Community				
Location	Very Dry Sites	Dry Sites	"Mesic" Sites	Moist Sites	Wet Sites
Coast Mountains		S	H		SM
Columbia Mountains		HM1	H	HM2	SM
Thompson Plateau	S	HM1	GS	H	

GS	Grass-sedge meadows dominated by fescues, bluegrass and sedges.
H	Alpine heath dominated by pink and white mountain-heathers.
HM1	Herb meadows with species such as woolly pussytoes, arctic lupine, Indian paintbrush and arnicas.
HM2	Herb meadows dominated by Sitka valerian.
S	Scrub, including willow and bog birch dominated sites.
SM	Sedge meadows.

Soils: Because of the active processes occurring in the AT zone, surface and subsurface soil horizons are often churned and intermixed, and Regosolic soils with disrupted horizons are common. Brunisols may dominate in drier areas or sites. Where sod has developed, Melanic and Sombric Brunisols with turfy Ah horizons can form. Areas with restricted drainage have Gleysolic soils. Ferro-Humic Podzols typically develop under krummholz, heather and scrub vegetation. Because of the steep topography, exposed bedrock or unconsolidated rock slopes make up much of the land surface. Humus forms on herb-dominated sites would be expected to be Rhizomulls, while Hemimors and Mormoders may be expected beneath alpine scrub and heath vegetation.

Subzones/Variants: The AT zone has been incompletely studied, and the zone can only be broadly divided into three areas: the maritime or coastal; northern Interior; and southern Interior. Further subdivisions could be made along climatic and elevational gradients corresponding to the climate regions.

Classification Features: At lower elevations of the AT zone, areas of alpine are often interspersed with areas of ESSF parkland. The boundary between the parkland, with its clumps of subalpine fir and Engelmann spruce surrounded by alpine vegetation, and the true alpine, with minor krummholz, is very difficult to determine. For this reason, plus a lack of data, these units have been mapped as a complex in the KFR.

5 SITE UNITS

Site units for 31 biogeoclimatic subzones and variants are presented in this section. Three biogeoclimatic phases are also included because of their large areal extent. A standardized 6-page layout is used for each biogeoclimatic unit, including:

- an overview for the biogeoclimatic unit
- an edatopic grid and list of site units
- a mesoslope diagram
- a vegetation table
- an environment table
- a site identification key

A description for each site identification aid and procedures for using each aid is outlined in Section 3 of the guide.

Appendix 2 contains tables summarizing the relationship between site units described in this guide and ecosystem units described by Mitchell and Green (1981), Lloyd (1984), Mitchell (1985), Erickson and Lloyd (1985) and Utzig *et al.* (1986).

OKANAGAN VERY DRY HOT BUNCHGRASS VARIANT

Distribution: The BGxh1 variant occupies low elevations at the southern end of the Okanagan Valley, from Summerland to the U.S. border, and east along the Similkameen River to the Ashnola River.

Elevational Range (Mean): 250-700 m

Climate: The BG is the hottest and driest zone in British Columbia. The BGxh1 has less extreme winter temperatures than the BGxh2.

Vegetation and Soils

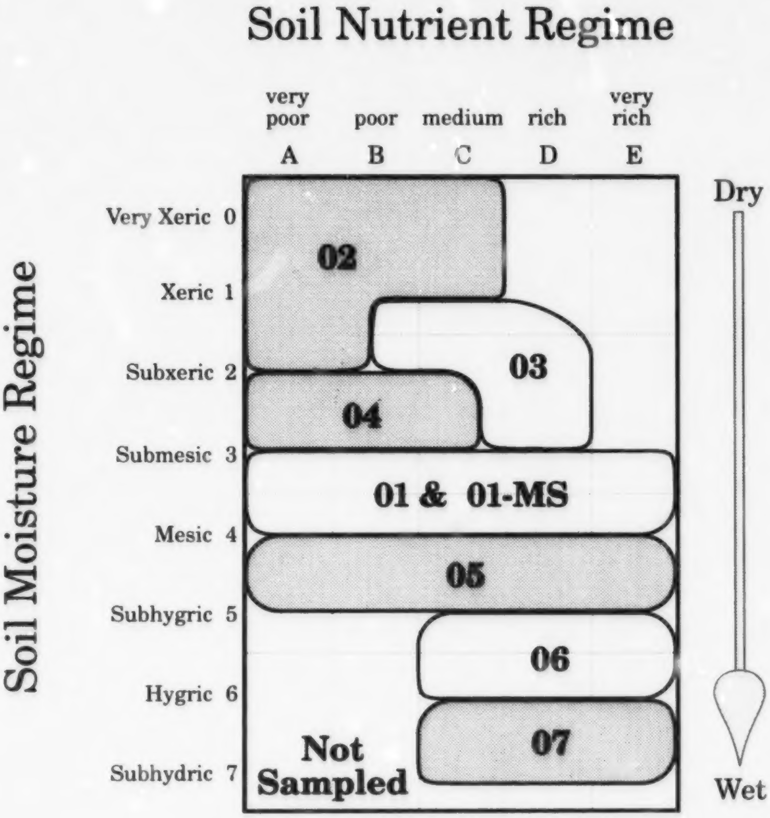
Zonal Sites: Climax sites are dominated by big sagebrush and bluebunch wheatgrass, with minor amounts of Sandberg's bluegrass. Bryophytes are generally sparse. *Tortula ruralis* generally occurs. Soils are dominantly Brown and Dark Brown Chernozems.

Dry Sites: These sites are characterized by an open shrub layer of scattered antelope-brush, rabbit-brush and, sometimes, big sagebrush. The herb layer is extremely variable. Bluebunch wheatgrass and the increasers, needle-and-thread grass and cheatgrass, commonly occur. *Tortula ruralis* is present in the poorly developed moss layer.

Wet Sites: Py, Act and At characterize the floodplains. The shrubby understory contains Nootka rose and red-osier dogwood. Water birch is common on the wettest sites. The herb cover is open, but diverse. Bryophytes are sparse.

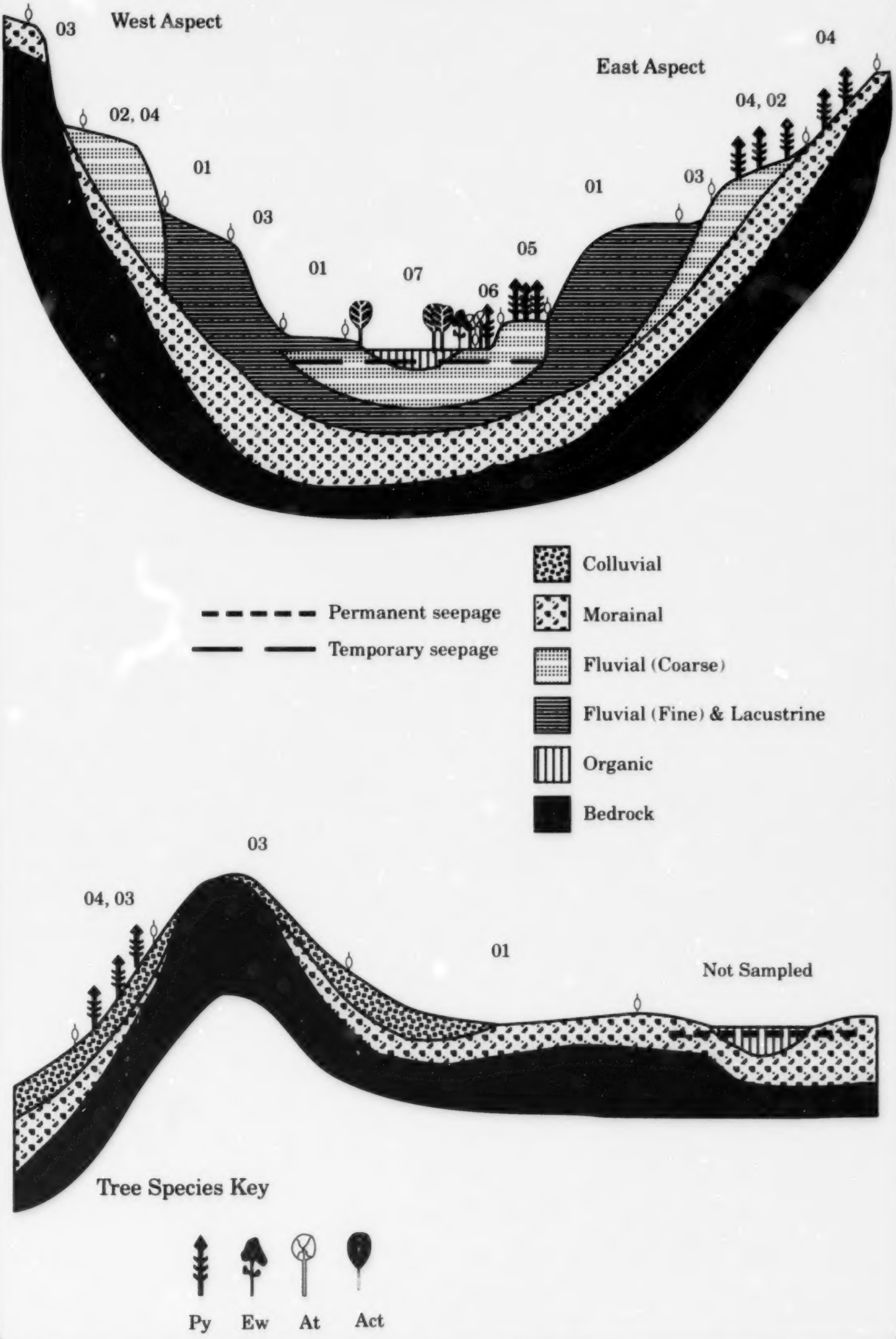
BGC Features: The presence of big sagebrush distinguishes the BGxh from other biogeoclimatic grasslands in the KFR. The presence of antelope-brush and threetip sagebrush on drier sites, and blue elderberry and mock-orange on seepage sites, separates this variant from the BGxh2.

Comments: The PPBG zone (Krajina 1969) has been divided to form the BG and PP zones. Most of the BGxh1 variant has been over-grazed in the past and is now in poor range condition, as indicated by the general abundance of cheatgrass and knapweed, and the low cover and vigour of bluebunch wheatgrass.



02	Antelope brush — Needle-and-thread grass
03	Bluebunch wheatgrass — Selaginella
04	Py — Antelope brush — Red three-awn
01-MS	Big sage — Needle-and-thread grass
Zonal 01	Big sage — Bluebunch wheatgrass
05	Py — Sumac
06	Py — Nootka rose — Poison ivy
07	Act — Water birch

BG xh1



West Aspect
03
02, 04
01
03
01
07
06
05
01
03
04, 02
04
East Aspect
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
03
04, 03
01
Not Sampled
Tree Species Key
Py
Ew
At
Act

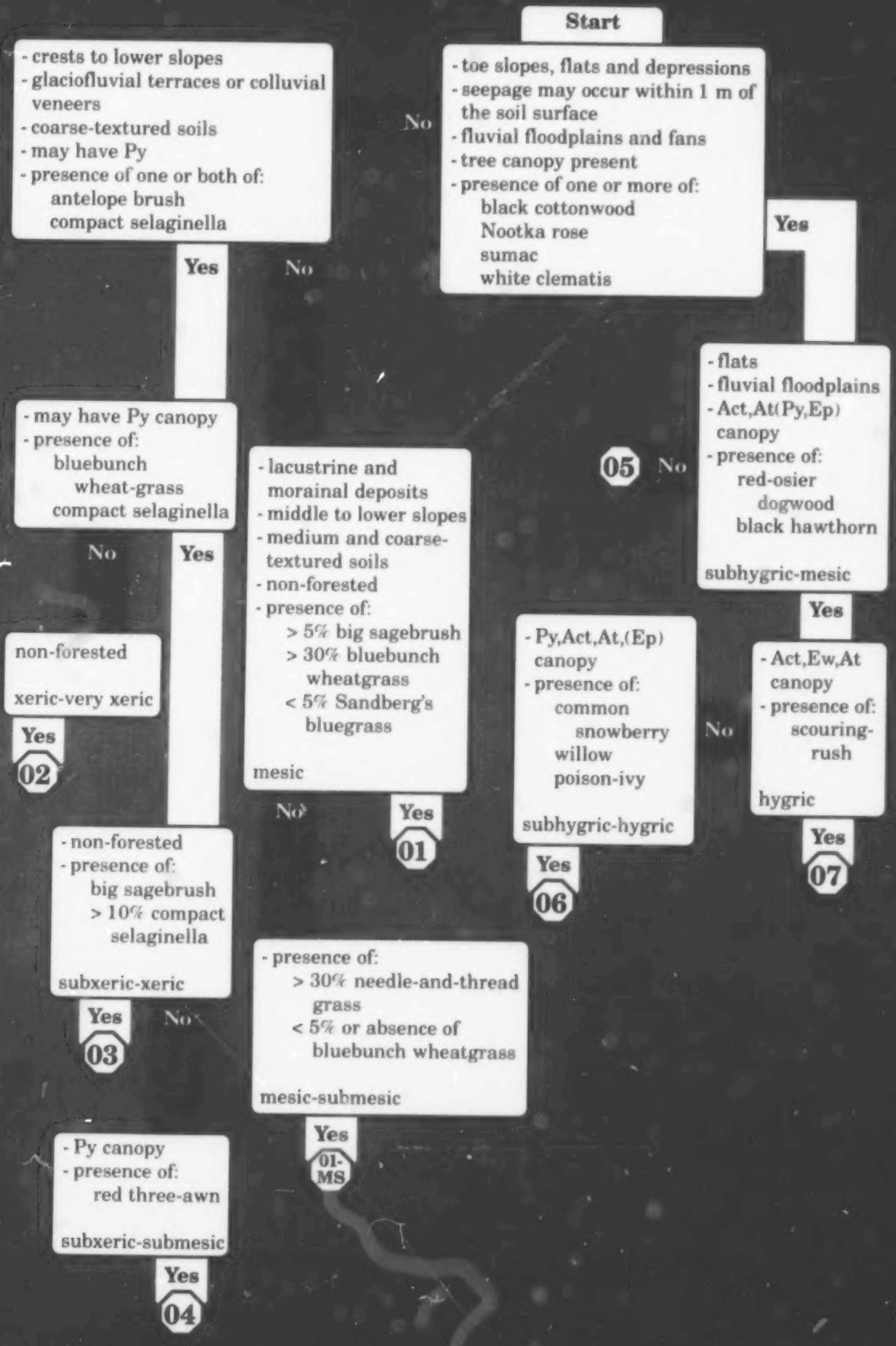
BG xh1 Vegetation Table

	Site Units	02	03	04	01-MS	01	05	06	07	
Trees	*Pinus ponderosa*			▬			▬	■		ponderosa pine
	Crataegus douglasii								▮	black hawthorn
	Populus balsamifera							■	▬	black cottonwood
	Populus tremuloides							■	▮	trembling aspen
Shrubs	*Purshia tridentata*	■	■	■			▮			antelope-brush
	Chrysothamnus nauseosus	■	▮							rabbit-brush
	Artemisia tridentata		■		■	■				big sagebrush
	Rhus glabra						■	▮		sumac
	Amelanchier alnifolia						▮	▮		saskatoon
	Philadelphus lewisii						▮			mock-orange
	Sambucus cerulea						▮			blue elderberry
	Prunus virginiana						▮	■		choke cherry
	Toxicodendron rydbergii						▮	■		poison-ivy
	Symphoricarpos albus							■		common snowberry
	Clematis ligusticifolia							▮	▮	white clematis
	Rosa nutkana						▮	▬	▬	Nootka rose
	Cornus sericea							▮	▬	red-osier dogwood
	Betula occidentalis								■	water birch
Herbs	*Bromus tectorum*	▬	▮	■			▮			cheatgrass
	Opuntia fragilis	▮			▮		▮			brittle prickly-pear cactus
	Sporobolus cryptandrus	▮								sand dropseed
	Stipa comata	■	▮	■	▬		▮			needle-and-thread grass
	Selaginella densa		▬	▮			▮			compact selaginella
	Agropyron spicatum		▬	■	▮	▬	▮			bluebunch wheatgrass
	Eriogonum niveum		▮	▮						snow buckwheat
	Aristida longiseta			■						red three-awn
	Achillea millefolium			▮			▮	▮		yarrow
	Poa pratensis			▮				▮		Kentucky bluegrass
	Poa sandbergii				■	▮				Sandberg's bluegrass
	Plantago patagonica				▮					Indian-wheat
	Phlox longifolia				▮					long-leaved phlox
	Apocynum cannabinum							▮		hemp dogbane
	Elymus cinereus							▮		giant wildrye
	Solidago canadensis							■		Canada goldenrod
	Smilacina stellata								■	star-flowered false Solomon's-seal
	Equisetum hyemale								■	scouring-rush
Mosses	*Tortula ruralis*	▮	▮	■	▮	▮				moss

BG xh1 Environment Table

Site Units	02	03	04	01-MS	01	05	06	07
					Zonal			
Soil Moisture Regime	X-VX	SX-X	SX-SM	M-SM	M	SHG-M	SHG-HG	HG
Prevailing Successional Stage Sampled	Maturing Seral	Young Climax		Maturing Seral	Young Climax		Maturing Seral	
Aspect	All						N/A	
Slope Gradient & Mesoslope Position	Gentle - steep Middle - lower	Variable	Variable Middle	Variable Lower	Gentle Middle	Gentle Toe	Flat Depression & toe	Flat Depression & lower
Soil Texture Class	Coarse			Medium		Coarse		
Parent Materials	FGt	FGt,Cv	FGt	Mb	LGt	Ff,FGt	Fb	
Important Soil Features	Some L		----	Some L	--------		Some W	

BG xh1


Start
- toe slopes, flats and depressions
- seepage may occur within 1 m of the soil surface
- fluvial floodplains and fans
- tree canopy present
- presence of one or more of:
black cottonwood
Nootka rose
sumac
white clematis
No
Yes
- crests to lower slopes
- glaciofluvial terraces or colluvial veneers
- coarse-textured soils
- may have Py
- presence of one or both of:
antelope brush
compact selaginella
Yes
No
- may have Py canopy
- presence of:
bluebunch wheat-grass
compact selaginella
No
Yes
non-forested
xeric-very xeric
Yes
02
- non-forested
- presence of:
big sagebrush
> 10% compact selaginella
subxeric-xeric
Yes
03
No
- Py canopy
- presence of:
red three-awn
subxeric-submesic
Yes
04
- lacustrine and morainal deposits
- middle to lower slopes
- medium and coarse-textured soils
- non-forested
- presence of:
> 5% big sagebrush
> 30% bluebunch wheatgrass
< 5% Sandberg's bluegrass
mesic
No
Yes
01
- presence of:
> 30% needle-and-thread grass
< 5% or absence of bluebunch wheatgrass
mesic-submesic
Yes
01-MS
- flats
- fluvial floodplains
- Act,At(Py,Ep) canopy
- presence of:
red-osier dogwood
black hawthorn
subhygric-mesic
05
No
Yes
- Py,Act,At,(Ep) canopy
- presence of:
common snowberry
willow
poison-ivy
subhygric-hygric
Yes
06
No
- Act,Ew,At canopy
- presence of:
scouring-rush
hygric
Yes
07

BG xh2

THOMPSON VERY DRY HOT BUNCHGRASS VARIANT

Distribution: The BGxh2 variant is found in the valley bottoms of the Thompson, Nicola and Fraser river systems. It extends along the Thompson River from Pritchard to just south of Spences Bridge. The BGxh2 extends approximately 15 km up the Deadman and Bonaparte rivers. It also extends from the confluence of the Thompson and Nicola rivers upstream to Skuhun Creek, and occurs along the Fraser River from just north of Lillooet to Big Bar Creek.

Elevational Range (Mean): 250-700 m

Climate: The BG is the hottest, driest zone in British Columbia. The BGxh2 is drier than the BGxhl and has more extreme winter temperatures and a shorter frost-free period. It is warmer and drier than the BGxw1.

Vegetation and Soils

Zonal Sites: At climax, these sites are dominated by big sagebrush and bluebunch wheatgrass, with minor amounts of pasture sage, Sandberg's bluegrass and brittle prickly-pear cactus. Exposed mineral soil and patches of crustose lichens are common. Soils are dominantly Brown Chernozems.

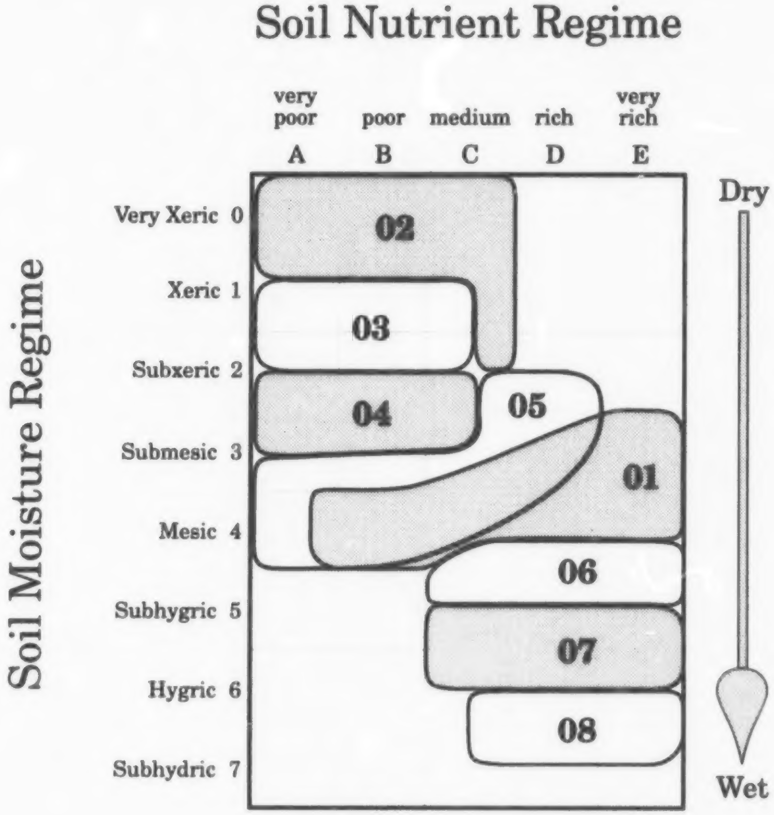
Dry Sites: Open stands of Py and bluebunch wheatgrass or red three-awn occur on steep south-facing slopes and on coarse glaciofluvial terraces. Compact selaginella and bluebunch wheatgrass dominate rock outcrops. On sandy sites, sand dropseed, needle-and-thread grass and Indian-ricegrass, dominate. Lichens are uncommon, possibly as a result of disturbance.

Wet Sites: Mixed stands of Act, At and Ep are common on riparian sites. A relatively dense shrub layer includes common snowberry, red-osier dogwood and Douglas maple. The herb and moss layers are poorly developed. Showy aster and common horsetail frequently occur.

BGC Features: The presence of big sagebrush distinguishes the BGxh from other grassland units in the Kamloops Forest region. The absence on drier sites of antelope-brush and threetip sagebrush, and of blue elderberry and mock-orange on seepage sites, separates this variant from the BGxh1.

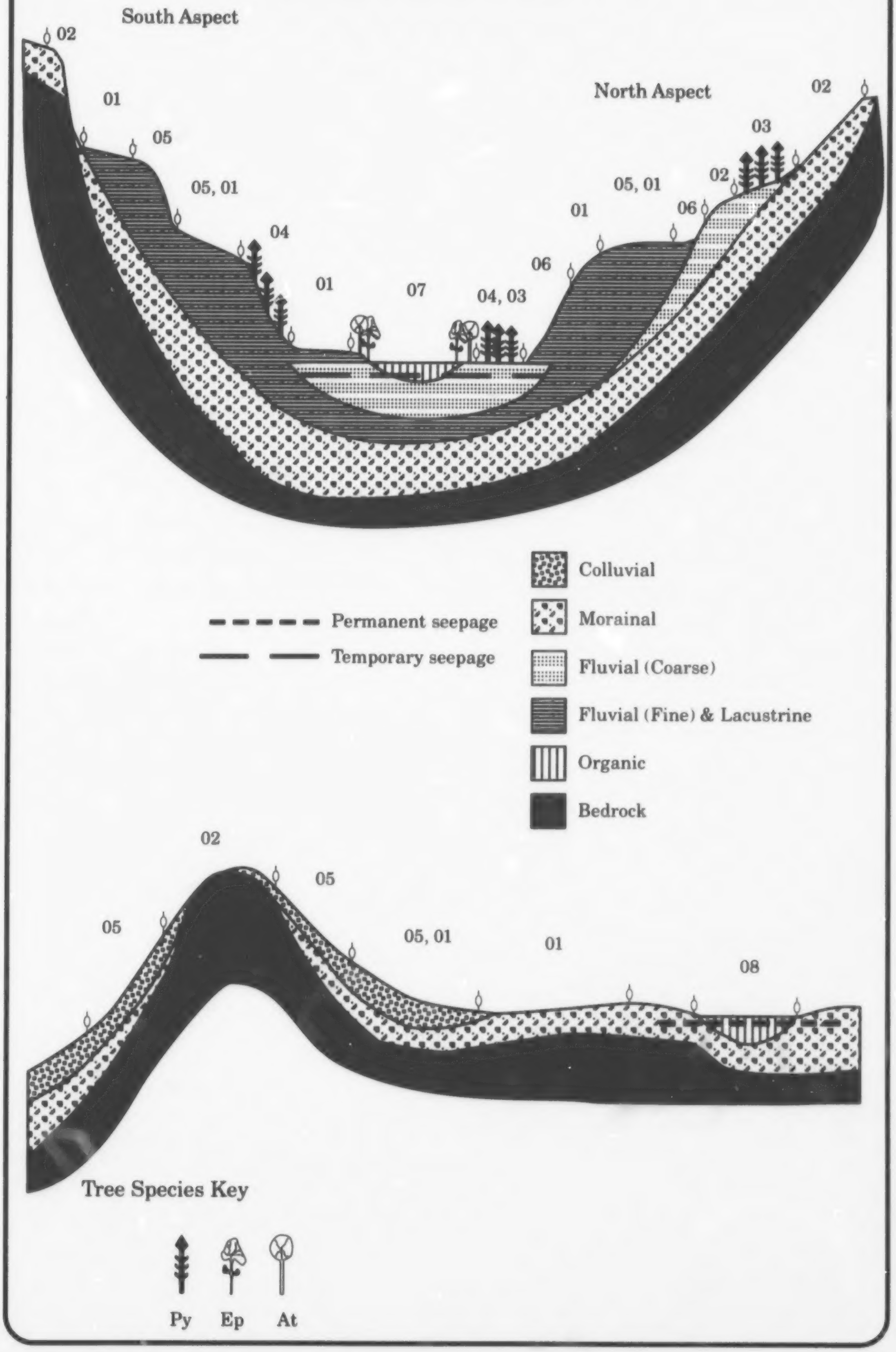
Comments: The PPBG zone (Krajina 1969) has been subdivided to create the BG and PP zones. There are very few climax plant communities in the BGxh2 because of heavy grazing pressure.

BG xh2



02	Bluebunch wheatgrass — Selaginella
03	Py — Red three-awn
04	Py — Bluebunch wheatgrass
05	Big sage — Needle-and-thread grass
Zonal 01	Big sage — Bluebunch wheatgrass
06	Rough fescue — Bluebunch wheatgrass
07	Act — Snowberry — Dogwood
08	Woolly sedge — Arctic rush

BG xh2


South Aspect
02
01
05
05, 01
04
01
07
04, 03
06
01
05, 01
06
02
03
North Aspect
02
Permanent seepage
Temporary seepage
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
02
05
05
05, 01
01
08
Tree Species Key
Py
Ep
At

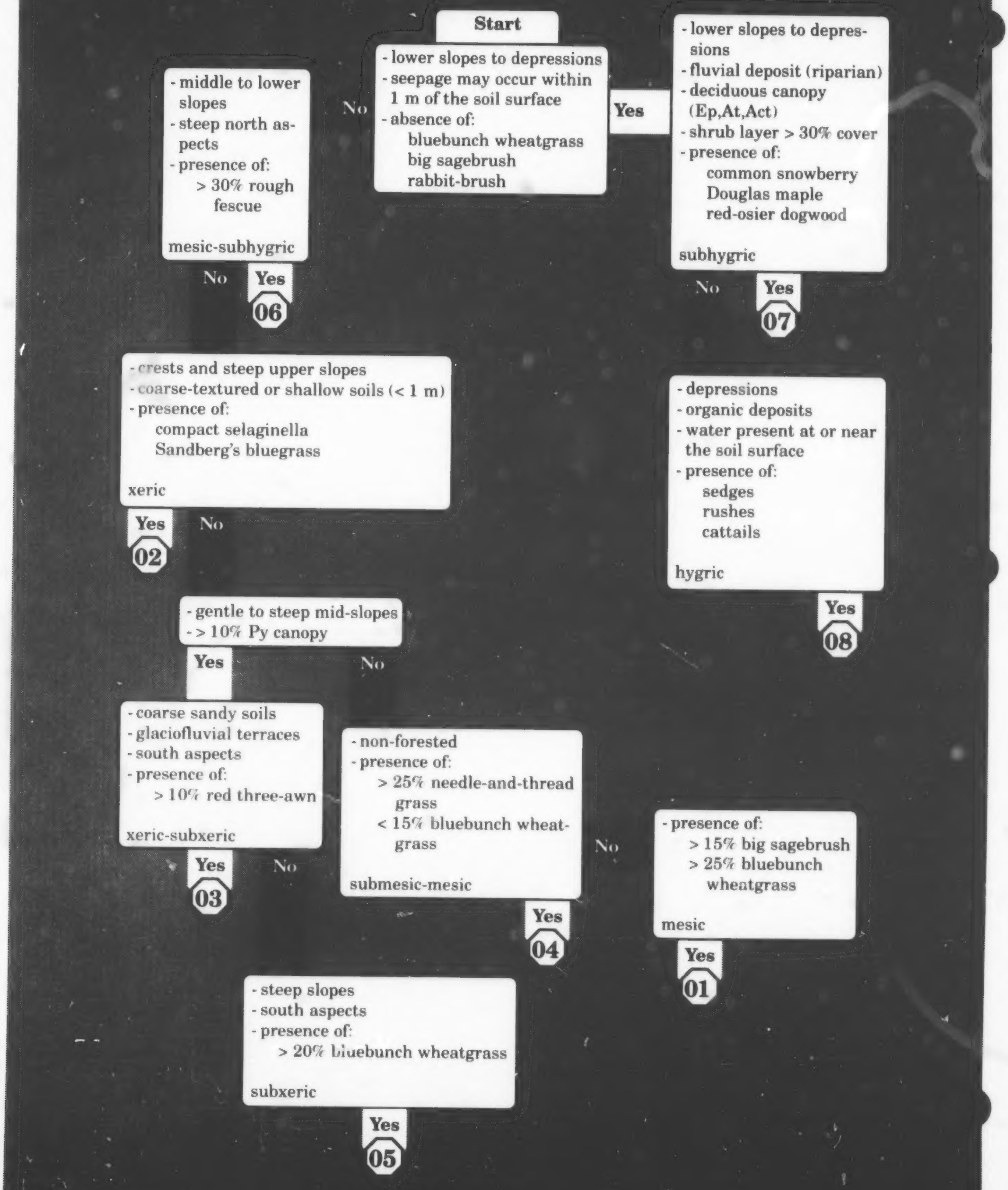
BG xh2 Vegetation Table

	Site Units	02	03	04	05	01	06	07	08	
Trees	*Pinus ponderosa*		▊	▊						ponderosa pine
	Populus balsamifera							▌		black cottonwood
	Populus tremuloides							▊		trembling aspen
	Betula papyrifera							█		paper birch
Shrubs	*Chrysothamnus nauseosus*	▏	▏	▏	▏	▏	▌			rabbit-brush
	Artemisia tridentata	▌	▏	▏	█	█	▏			big sagebrush
	Artemisia frigida	▏		▏	▌	▌	▏			pasture sage
	Alnus spp.							▏		alders
	Acer glabrum							▊		Douglas maple
	Cornus sericea							▌		red-osier dogwood
	Symphoricarpos albus							█		common snowberry
Herbs	*Selaginella densa*	█								compact selaginella
	Agropyron spicatum	█	▌	█	▏	█	█			bluebunch wheatgrass
	Antennaria umbrinella	▏					▏			umber pussytoes
	Stipa hymenoides		▌							Indian-ricegrass
	Aristida longiseta		█							red three-awn
	Comandra umbellata		▏							pale comandra
	Poa sandbergii	▌			▌	▏				Sandberg's bluegrass
	Achillea millefolium		▏	▏			▏			yarrow
	Stipa comata		▏		█					needle-and-thread grass
	Sporobolus cryptandrus		▏		▌					sand dropseed
	Opuntia fragilis		▏		▏	▏				brittle prickly-pear cactus
	Bromus tectorum		▏		▏					cheatgrass
	Tragopogon spp.			▏						salsifies
	Balsamorhiza sagittata			▏						arrow-leaved balsamroot
	Astragalus spp.			▏						milk-vetches
	Erigeron filifolius				▏					thread-leaved fleabane
	Zigadenus venenosus						▏			meadow death-camas
	Heuchera cylindrica						▏			round-leaved alumroot
	Geum triflorum						▏			old man's whiskers
	Festuca scabrella						█			rough fescue
	Erigeron corymbosus						▏			long-leaved fleabane
	Aster conspicuus							▏		showy aster
	Equisetum arvense							▏		common horsetail
	Juncus arcticus								█	arctic rush
	Carex lanuginosa								█	woolly sedge
Mosses & Lichens	*Cladonia* spp.	▏					▏			lichens
	Brachythecium albicans						▌			lawn moss
	Calliergon cordifolium								█	moss

BG xh2 Environment Table

Site Units	02	03	04	05	01	06	07	08
					Zonal			
Soil Moisture Regime	X	X-SX	SX-SM	SM-M	M-SM	M-SHG	SHG-HG	HG-SHD
Prevailing Successional Stage Sampled	Young Climax			Maturing Seral	Young Climax			
Aspect	All	South			All	North	N/A	
Slope Gradient & Mesoslope Position	Steep Crest	Gentle - steep Middle	Steep Middle	Gentle Middle (upper)	Gentle (steep) Middle (low.-up.)	Steep Middle - lower	Flat Lower - depression	Flat Depression & level
Soil Texture Class	Coarse		Med-Crse	Med-Fine	Fine-Med	Medium	Med-Crse	Medium
Parent Materials	FGt		Cb	Mb,LGt	LGt,Mb,Cb	Cb	----	Fb
Important Soil Features	----------						Some W	

BG xh2


Start
- lower slopes to depressions
- seepage may occur within 1 m of the soil surface
- absence of:
bluebunch wheatgrass
big sagebrush
rabbit-brush
Yes
- lower slopes to depressions
- fluvial deposit (riparian)
- deciduous canopy (Ep,At,Act)
- shrub layer > 30% cover
- presence of:
common snowberry
Douglas maple
red-osier dogwood
subhygric
Yes
07
No
- depressions
- organic deposits
- water present at or near the soil surface
- presence of:
sedges
rushes
cattails
hygric
Yes
08
No
- middle to lower slopes
- steep north aspects
- presence of:
> 30% rough fescue
mesic-subhygric
Yes
06
No
- crests and steep upper slopes
- coarse-textured or shallow soils (< 1 m)
- presence of:
compact selaginella
Sandberg's bluegrass
xeric
Yes
02
No
- gentle to steep mid-slopes
- > 10% Py canopy
Yes
- coarse sandy soils
- glaciofluvial terraces
- south aspects
- presence of:
> 10% red three-awn
xeric-subxeric
Yes
03
No
- steep slopes
- south aspects
- presence of:
> 20% bluebunch wheatgrass
subxeric
Yes
05
No
- non-forested
- presence of:
> 25% needle-and-thread grass
< 15% bluebunch wheatgrass
submesic-mesic
Yes
04
No
- presence of:
> 15% big sagebrush
> 25% bluebunch wheatgrass
mesic
Yes
01

NICOLA VERY DRY WARM BUNCHGRASS VARIANT

Distribution: The BGxw1 subzone occurs above the BGxh2 south of Kamloops to Merritt, and includes the Douglas Plateau from Chapperon Lake south along Quilchena Creek to Courtney Lake. It also occurs east of Kamloops, along the South Thompson River to Pritchard, and in the Lac du Bois area north of Kamloops.

Elevational Range (Mean): 330-1000 m

Climate: The BGxw1 variant is characterized by slightly higher precipitation, cooler temperatures and a shorter growing season than the BGxh.

Vegetation and Soils

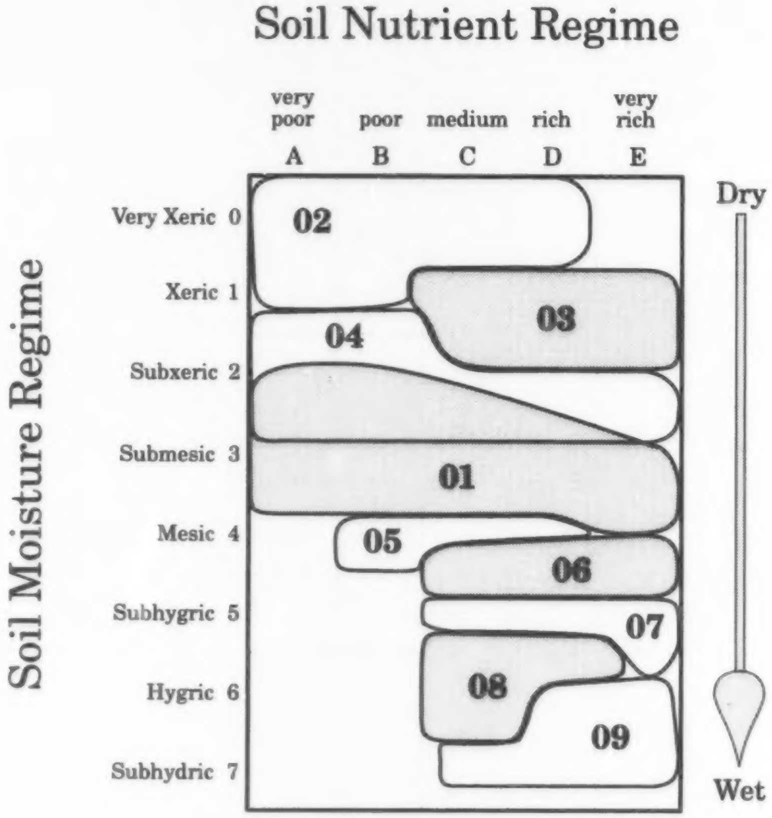
Zonal Sites: At climax, these sites are dominated by bluebunch wheatgrass, with minor amounts of junegrass, Sandberg's bluegrass, pasture sage and rabbit-brush. The bryophyte layer is open, with patches of lichens and the moss, *Tortula ruralis*. The soils are primarily Dark Brown Chernozems and, less commonly, Brown Chernozems.

Dry Sites: These are grasslands with a sparse cover of pasture sage, rabbit-brush and big sagebrush. Bluebunch wheatgrass is the dominant grass. Compact selaginella is the dominant herb on sites in good range condition. A common increaser is needle-and-thread grass. Exposed soil is common with a low occurrence of lichens.

Wet Sites: The riparian sites are characterized by open stands of At. The shrubby understory includes common snowberry, Nootka rose and red-osier dogwood. Kentucky bluegrass is the common herb. On wetter sites, giant wildrye dominates; there are lesser amounts of rushes. The bryophyte layer is sparse.

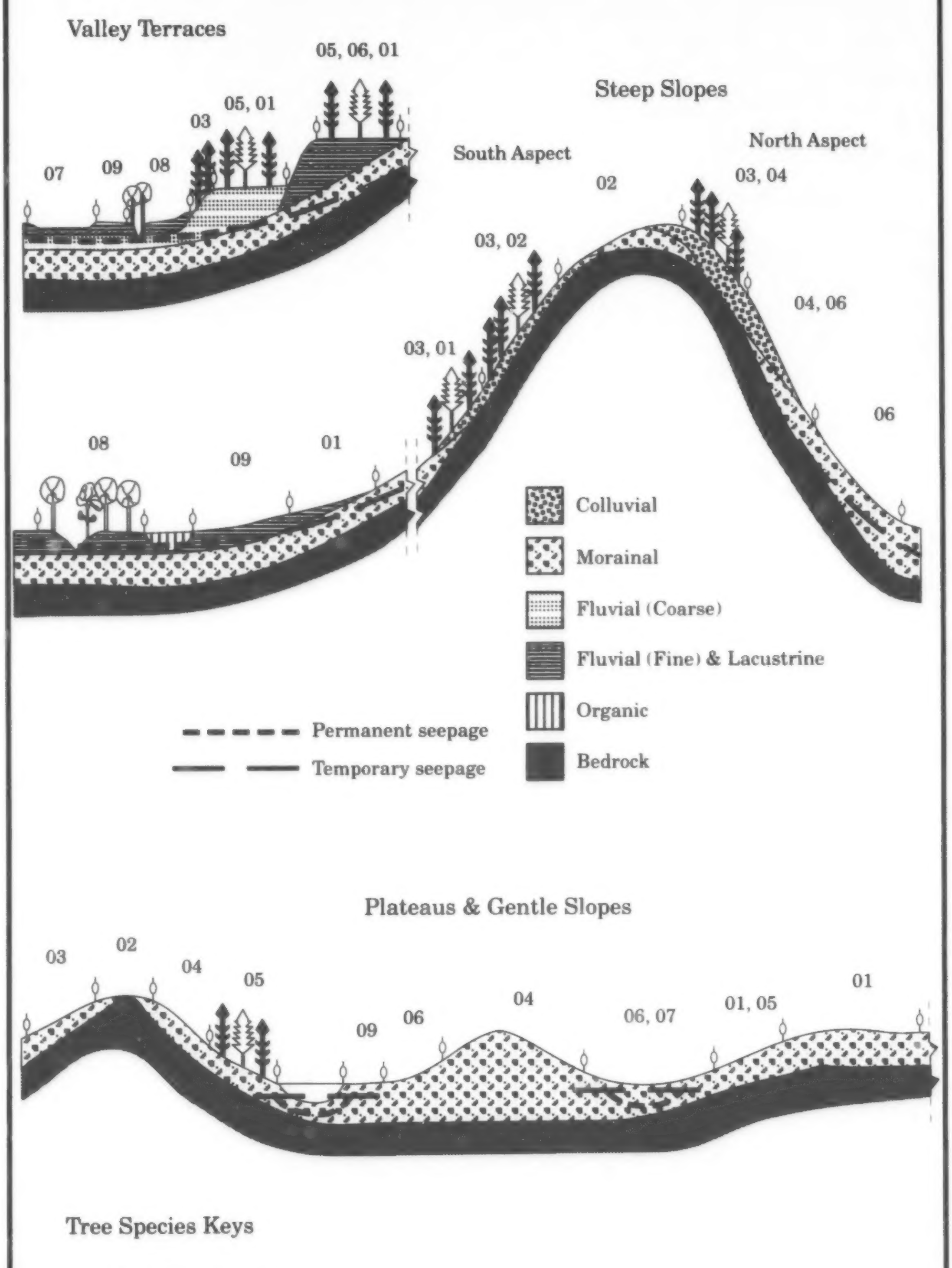
BGC Features: The presence of big sagebrush in the BGxh, and fescues and silky lupine in the IDF grassland phases, distinguishes these units from the BGxw1.

Comments: The PPBG zone (Krajina 1969) has been divided to form the PP and the BG zones. The BGxw1 occupies a geographical area commonly referred to as the "middle grasslands" (Nicholson *et al.* 1982).

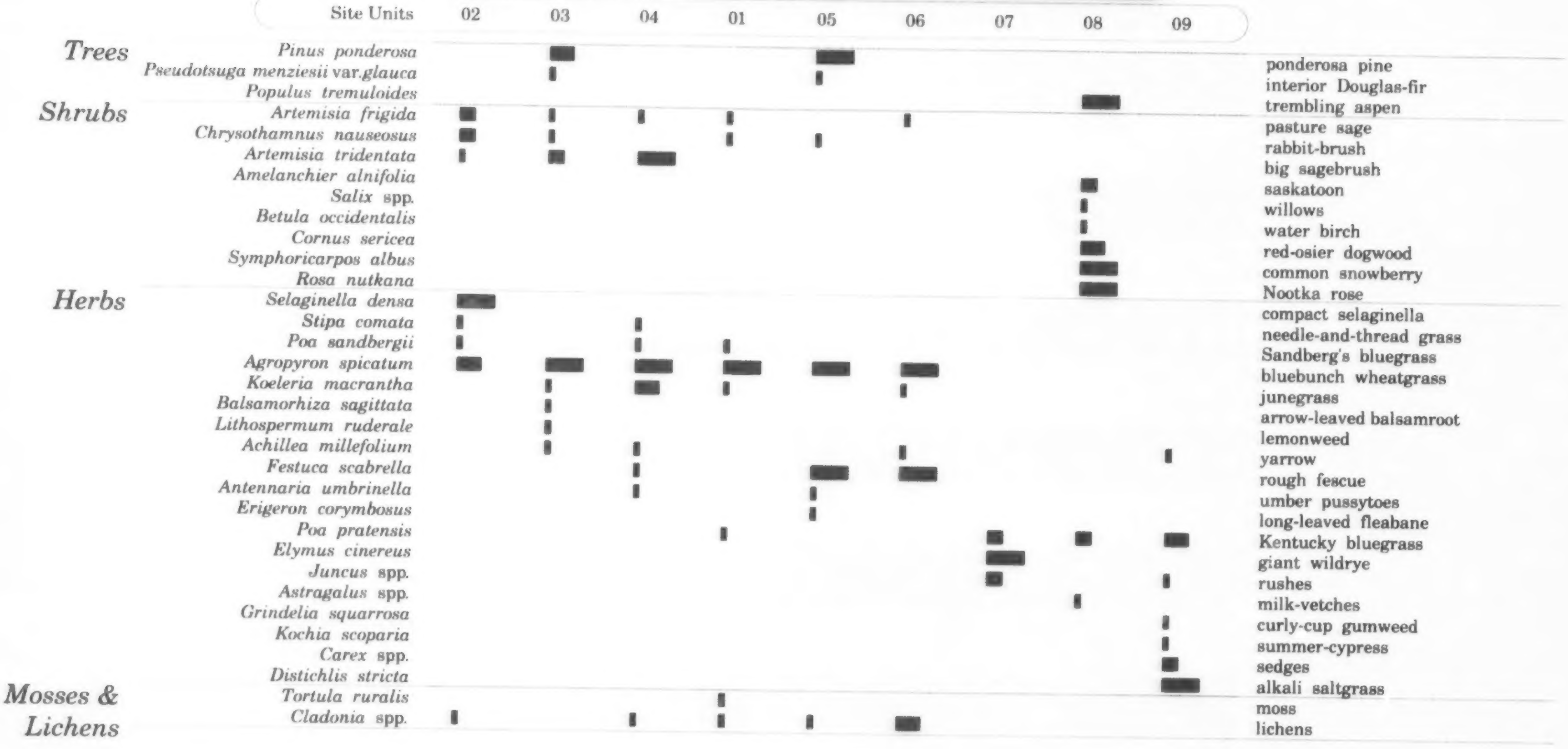


02	Bluebunch wheatgrass — Selaginella
03	Py — Bluebunch wheatgrass
04	Big sage — Bluebunch wheatgrass
Zonal 01	Bluebunch wheatgrass — Junegrass
05	Py — Rough fescue — Bluebunch wheatgrass
06	Rough fescue — Bluebunch wheatgrass
07	Giant wildrye
08	At — Snowberry — Kentucky bluegrass
09	Salt grass — Sedge

BG xw1


Valley Terraces
07
09
08
03
05, 01
05, 06, 01
Steep Slopes
South Aspect
North Aspect
02
03, 04
03, 02
04, 06
03, 01
06
08
09
01
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03
02
04
05
09
06
04
06, 07
01, 05
01
Tree Species Keys
Fd
At
Ep
Py

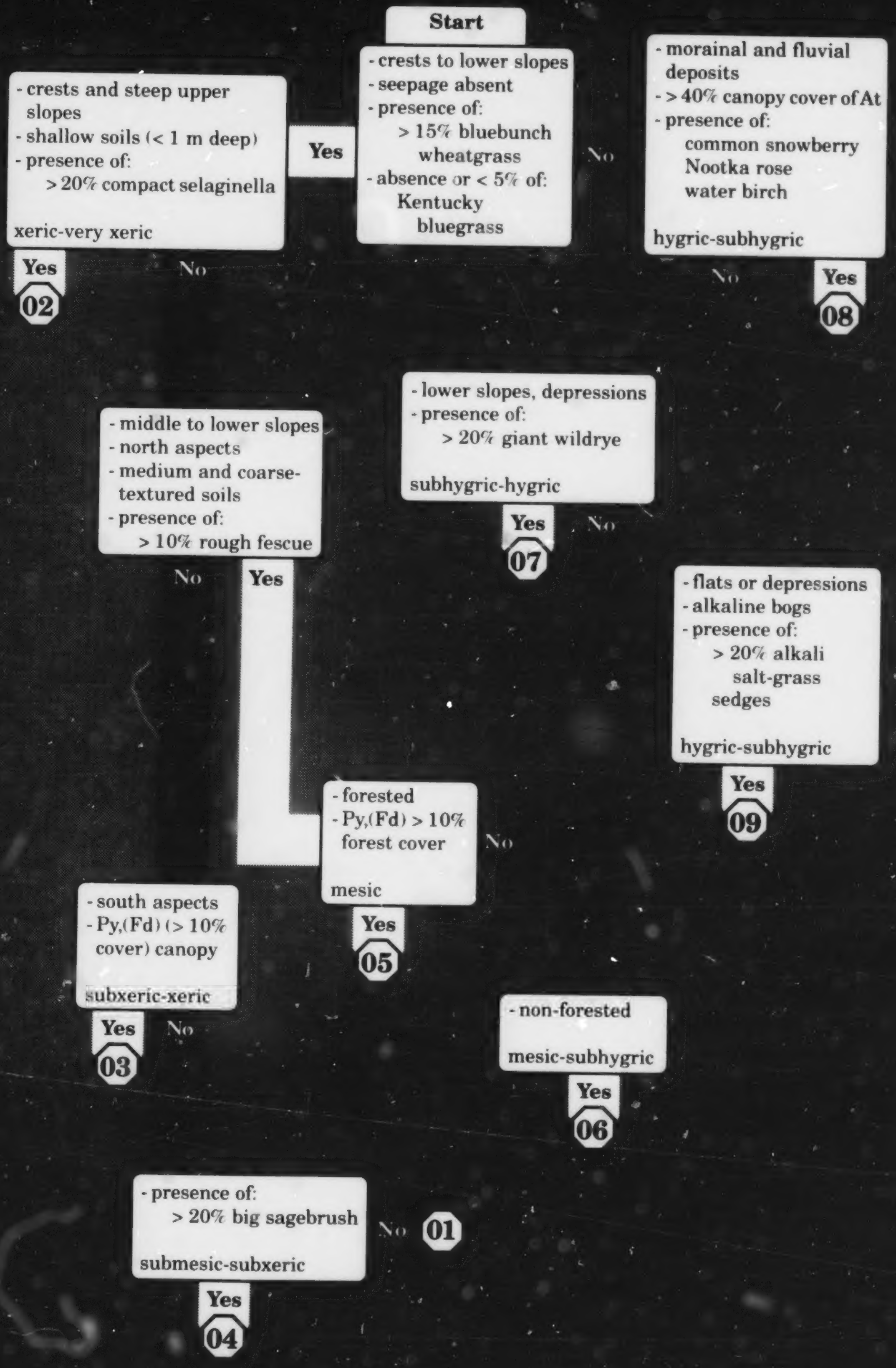
BG xw1 Vegetation Table



BG xw1 Environment Table

Site Units	02	03	04	01	05	06	07	08	09
				Zonal					
Soil Moisture Regime	X-VX	SX-X	SM-SX	M-SX	M	M-SHG	SHG-HG	HG-SHG	HG-SHG
Prevailing Successional Stage Sampled	Young Climax							Young Climax	Maturing Seral
Aspect	All	South	All		North		North	N/A	
Slope Gradient & Mesoslope Position	Steep - gentle Upper - crest	Steep - gentle Middle	Gentle Middle	Gentle - steep Middle	Gentle - steep Middle - lower	Gentle - middle Lower	Gentle - level Lower & toe	Flat Toe	Flat Toe & depression
Soil Texture Class	Medium				Medium - Coarse		Medium	Medium	Med-Fine
Parent Materials	Cv,Mv	Cv,Mv,Mb	Mb	Ev/Mb,Cb	Mb,LGt		LGb	Mb,Fb	Fb,LGb
Important Soil Features	Some L			--------				----	Some W

BG xw1



- crests to lower slopes
- seepage absent
- presence of:
  - > 15% bluebunch wheatgrass
- absence or < 5% of:
  - Kentucky bluegrass

- crests and steep upper slopes
- shallow soils (< 1 m deep)
- presence of:
  - > 20% compact selaginella

xeric-very xeric

- morainal and fluvial deposits
- > 40% canopy cover of At
- presence of:
  - common snowberry
  - Nootka rose
  - water birch

hygric-subhygric

- lower slopes, depressions
- presence of:
  - > 20% giant wildrye

subhygric-hygric

- middle to lower slopes
- north aspects
- medium and coarse-textured soils
- presence of:
  - > 10% rough fescue

- flats or depressions
- alkaline bogs
- presence of:
  - > 20% alkali salt-grass
  - sedges

hygric-subhygric

- forested
- Py,(Fd) > 10% forest cover

mesic

- south aspects
- Py,(Fd) (> 10% cover) canopy

subxeric-xeric

- non-forested

mesic-subhygric

- presence of:
  - > 20% big sagebrush

submesic-subxeric

OKANAGAN VERY DRY HOT PONDEROSA PINE VARIANT

Distribution: The PPxh1 variant is centred in the Okanagan Valley, from south of Vernon to the U.S. border. It occurs as an elevational band above the BGxh1 and below the IDFxh1.

Elevational Range (Mean): 335-940 m

Climate: The PP zone is the driest forested zone in British Columbia. Because of its more southern latitude, the PPxh1 has less extreme winter temperatures than the PPxh2.

Vegetation and Soil

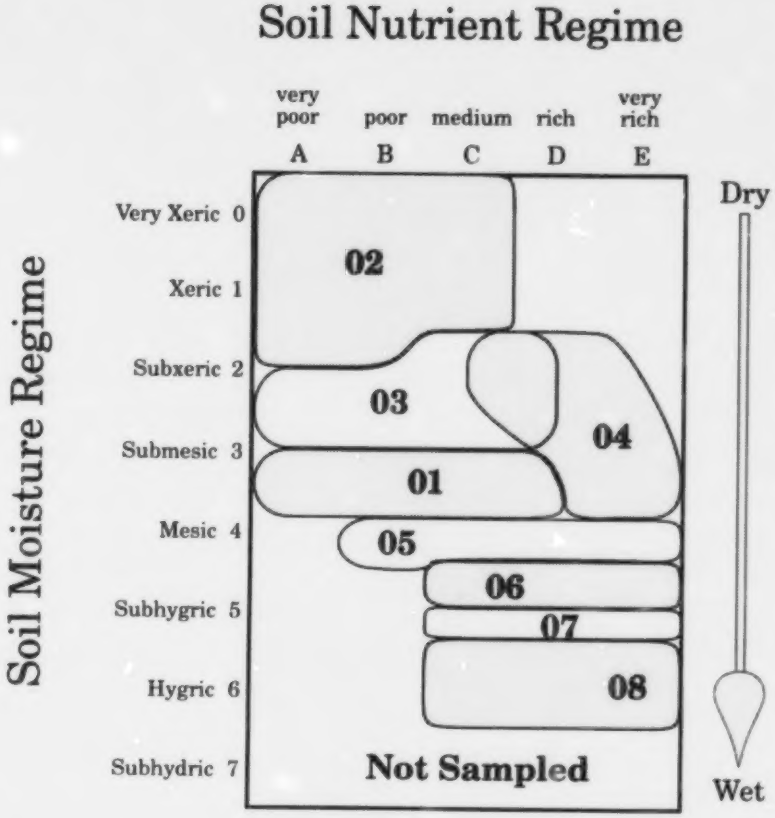
Zonal Sites: Open, young climax stands are composed of Py and minor Fd. The shrub layer is open or absent. Bluebunch wheatgrass is the dominant herb, with lesser amounts of arrow-leaved balsamroot, Idaho fescue and timber milk-vetch. Mosses are generally absent.

Dry Sites: Open Py stands occupy steep rocky south-facing slopes. These sites usually lack shrubs and have an open herb layer dominated by the grass, red three-awn. The moss layer is generally poorly developed, and exposed mineral soil is common. Less extreme slopes contain open grasslands dominated by bluebunch wheatgrass and big sagebrush.

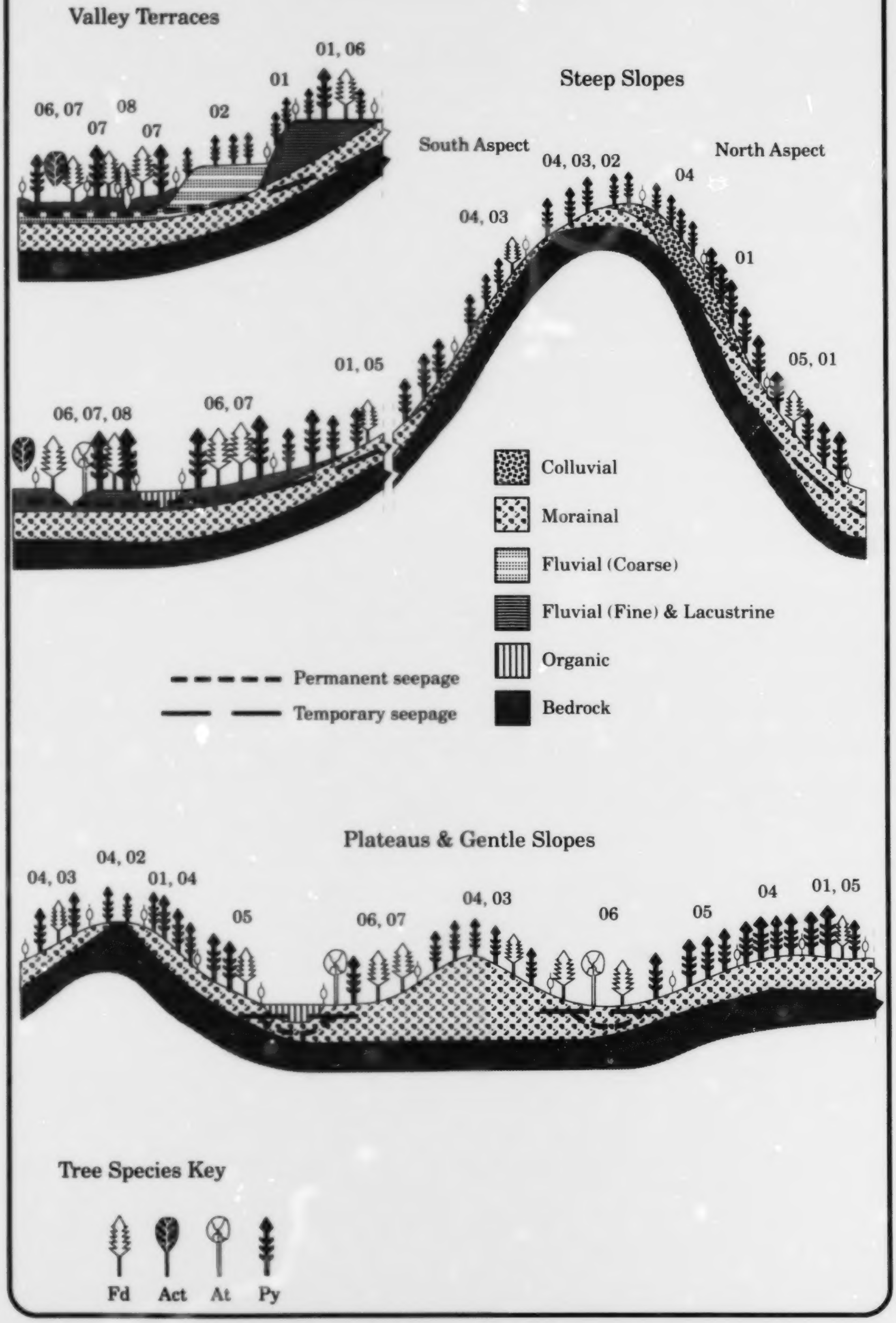
Wet Sites: Cool, steep, north-facing slopes contain young climax stands of Fd with lesser amounts of Py or At. The shrubby understory has common snowberry, Nootka rose, tall Oregon-grape and pinegrass. On wetter sites, dense stands of Fd mixed with At are common. The shrubby understory has tall Oregon-grape, common snowberry and water birch. The herbaceous layer is dominated by bluegrasses. Bryophytes are sparse.

BGC Features: The PP zone is distinguished from other zones by climax stands of Py and bluebunch wheatgrass. The absence of pinegrass on zonal sites separates the PP zone from the adjacent IDF zone. Idaho fescue and arrow-leaved balsamroot are common in the PPxh1 but absent from the PPxh2.

Comments: The PPBG zone (Krajina 1969) has been subdivided to form the PP and BG zones. The PP zone is a mosaic of grassland and forest communities.



02	Py — Red three-awn
03	Big sage — Bluebunch wheatgrass
04	Py — Bluebunch wheatgrass — Cheatgrass
Zonal 01	Py — Bluebunch wheatgrass — Idaho fescue
05	Py — Bluebunch wheatgrass — Rough fescue
06	FdPy — Snowberry — Pinegrass
07	FdPy — Snowberry — Spirea
08	Fd — Water birch — Douglas maple


Valley Terraces
01, 06
01
06, 07
08
07
07
02
Steep Slopes
South Aspect
North Aspect
04, 03, 02
04
04, 03
01
01, 05
05, 01
06, 07, 08
06, 07
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
04, 02
04, 03
01, 04
05
06, 07
04, 03
06
05
04
01, 05
Tree Species Key
Fd
Act
At
Py

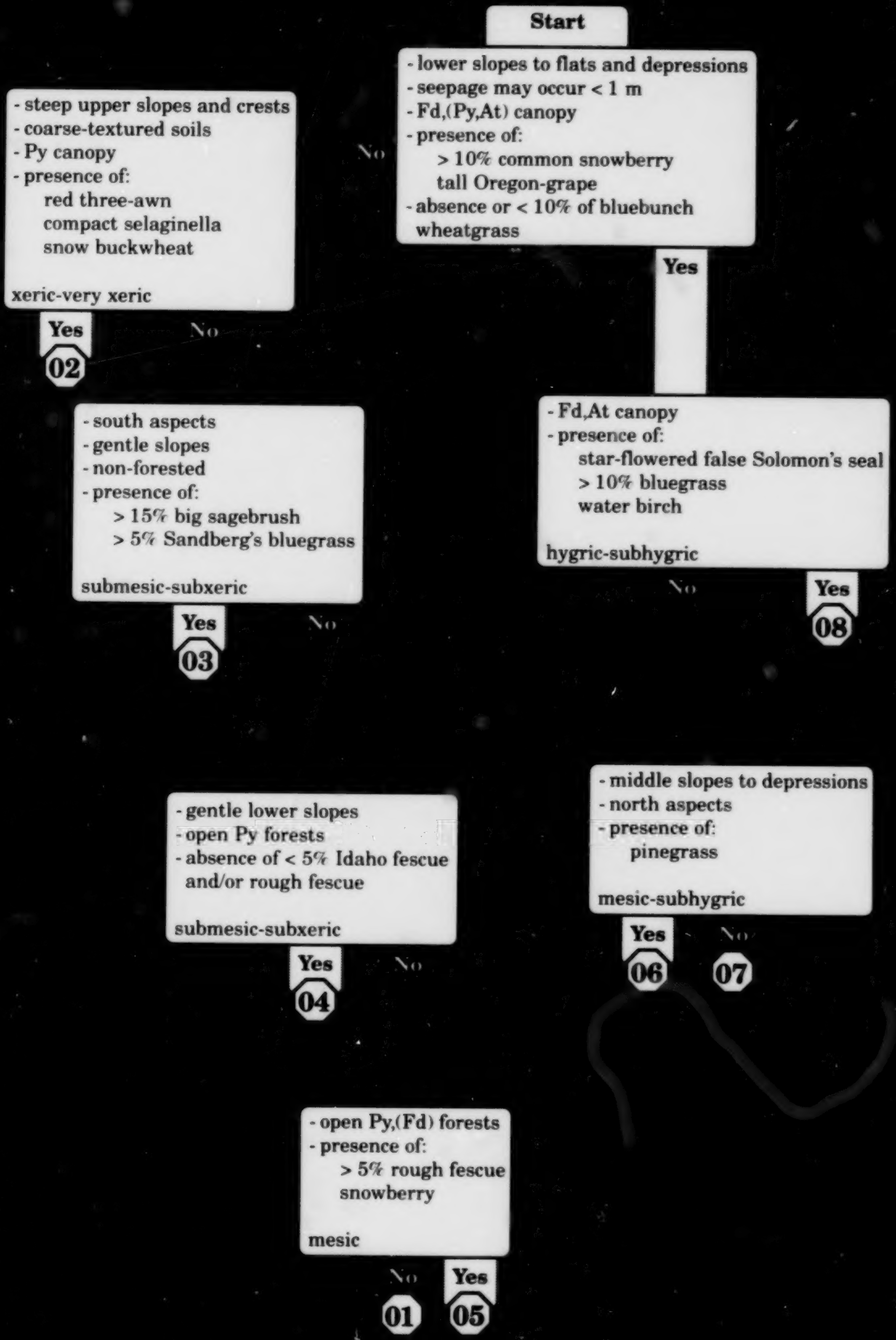
PP xh1 Vegetation Table

	Site Units	02	03	04	01	05	06	07	08	
Trees	*Pinus ponderosa*	▬		■	▬	▬	■	▬		ponderosa pine
	Pseudotsuga menziesii var.glauca					■	▬	■	▬	interior Douglas-fir
	Populus tremuloides						■		■	trembling aspen
Shrubs	*Artemisia tridentata*		▬							big sagebrush
	Amelanchier alnifolia					▮	▮	▮		saskatoon
	Symphoricarpos albus					▮	▬	▬	■	common snowberry
	Rosa nutkana						■	■		Nootka rose
	Spiraea betulifolia							■		birch-leaved spirea
	Mahonia aquifolium						■	▮	■	tall Oregon-grape
	Acer glabrum						▮		▮	Douglas maple
	Cornus sericea								▮	red-osier dogwood
	Betula occidentalis								■	water birch
Herbs	*Aristida longiseta*	■								red three-awn
	Eriogonum niveum	▮								snow buckwheat
	Opuntia fragilis	▮								brittle prickly-pear cactus
	Selaginella densa	▮								compact selaginella
	Bromus tectorum	▮		■						cheatgrass
	Achillea millefolium	▮	▮	▮	▮	▮		▮		yarrow
	Agropyron spicatum	▮	▬	▬	▬	▬				bluebunch wheatgrass
	Balsamorhiza sagittata	▮	▮	■	■	▬				arrow-leaved balsamroot
	Poa sandbergii		■							Sandberg's bluegrass
	Plantago patagonica		▮							Indian-wheat
	Poa spp.			▮				▮	▬	bluegrasses
	Lithospermum ruderale			▮						lemonweed
	Festuca idahoensis				■	▮				Idaho fescue
	Astragalus miser				▮	▮				timber milk-vetch
	Festuca scabrella					■				rough fescue
	Crepis atrabarba					▮				slender hawksbeard
	Koeleria macrantha					▮				junegrass
	Calamagrostis rubescens						▬			pinegrass
	Galium boreale							▮		northern bedstraw
	Viola spp.								▮	violets
	Smilacina stellata								▮	star-flowered false Solomon's-seal
Mosses & Lichens	*Tortula ruralis*	▮	▮	▮		▮				moss
	Cladonia spp.		■							lichens
	Ceratodon purpureus			■						moss
	Peltigera rufescens			▮						lichen
	Brachythecium spp.					■	▮			mosses

PP xh1 Environment Table

Site Units	02	03	04	01	05	06	07	08
				Zonal				
Soil Moisture Regime	X-VX	SM-SX	SM-SX	SM-M	M	M-SHG	SHG	HG-SHG
Prevailing Successional Stage Sampled	Maturing Seral		Young Climax					
Aspect	South		All			North	N/A	
Slope Gradient & Mesoslope Position	Steep Upper - middle	Gentle Upper - middle	Gentle Lower	Gentle Middle - lower	Gentle Middle - lower	Gentle Lower & depression	Gentle Toe	Flat Level & depression
Soil Texture Class	Coarse	Medium		Variable		Medium		
Parent Materials	FGt,Cv	Mb,FGt	Mb	Mb,FGt	Mb	LGb,Fb,Mb	LGt,Mb	FGt
Important Soil Features	Some L	--------					Some W	

PP xh1



Start

- lower slopes to flats and depressions
- seepage may occur < 1 m
- Fd,(Py,At) canopy
- presence of:
  - > 10% common snowberry
  - tall Oregon-grape
- absence or < 10% of bluebunch wheatgrass

- steep upper slopes and crests
- coarse-textured soils
- Py canopy
- presence of:
  - red three-awn
  - compact selaginella
  - snow buckwheat

xeric-very xeric

- Fd,At canopy
- presence of:
  - star-flowered false Solomon's seal
  - > 10% bluegrass
  - water birch

hygric-subhygric

- south aspects
- gentle slopes
- non-forested
- presence of:
  - > 15% big sagebrush
  - > 5% Sandberg's bluegrass

submesic-subxeric

- middle slopes to depressions
- north aspects
- presence of:
  - pinegrass

mesic-subhygric

- gentle lower slopes
- open Py forests
- absence of < 5% Idaho fescue and/or rough fescue

submesic-subxeric

- open Py,(Fd) forests
- presence of:
  - > 5% rough fescue
  - snowberry

mesic

THOMPSON VERY DRY HOT PONDEROSA PINE VARIANT

Distribution: The PPxh2 is found in valley bottoms from Lytton to north of Lillooet, along the Yalakom River to the Bridge River and along the Nicola River from the Fraser River to Stump Lake. It also occurs above either the BGxh2 or the BGxw1 and below the IDFxh2, from Lytton to just west of Chase.

Elevational Range (Mean): 400-950 m

Climate: The PP zone is the driest forested zone in British Columbia. Because of latitude, the climate of the PPxh2 is cooler than the PPxh1 and has fewer growing degree days and a shorter frost-free period.

Vegetation and Soils

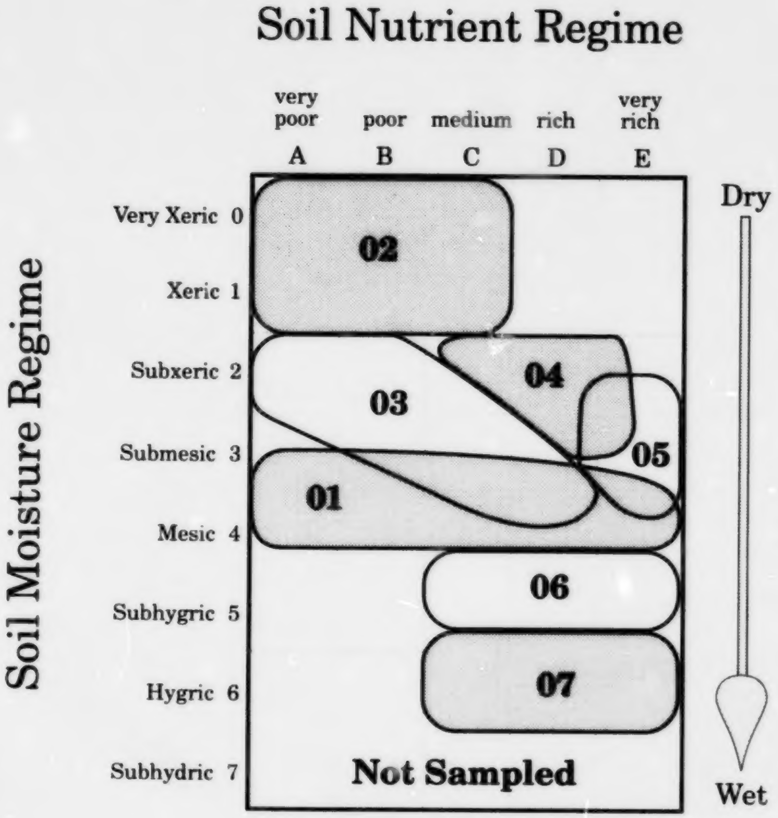
Zonal Sites: Open climax stands contain Py and minor amounts of Fd. The sparse shrub layer includes rabbit-brush and saskatoon. Bluebunch wheatgrass and rough fescue dominate the well-developed herb layer. Numerous other herbs occur with a low cover. The moss layer is absent. Soils are generally Orthic Brown and Eluviated Brown Chernozems.

Dry Sites: The open climax stands are composed of Py and Fd. Big sagebrush and bluebunch wheatgrass dominate the understory. On rock outcrops, there is a sparse shrub cover and a dense cover of compact selaginella and bluebunch wheatgrass. Lichens are generally present.

Wet Sites: Cooler north slopes contain open, young climax stands of Py and Fd, an understory dominated by common snowberry and saskatoon, and lesser amounts of pinegrass. On floodplains, Act occurs with a shrubby understory composed of common snowberry, roses and water birch. The variable herb layer includes pinegrass, Kentucky bluegrass, star-flowered false Solomon's-seal and asters. The moss layer is sparse.

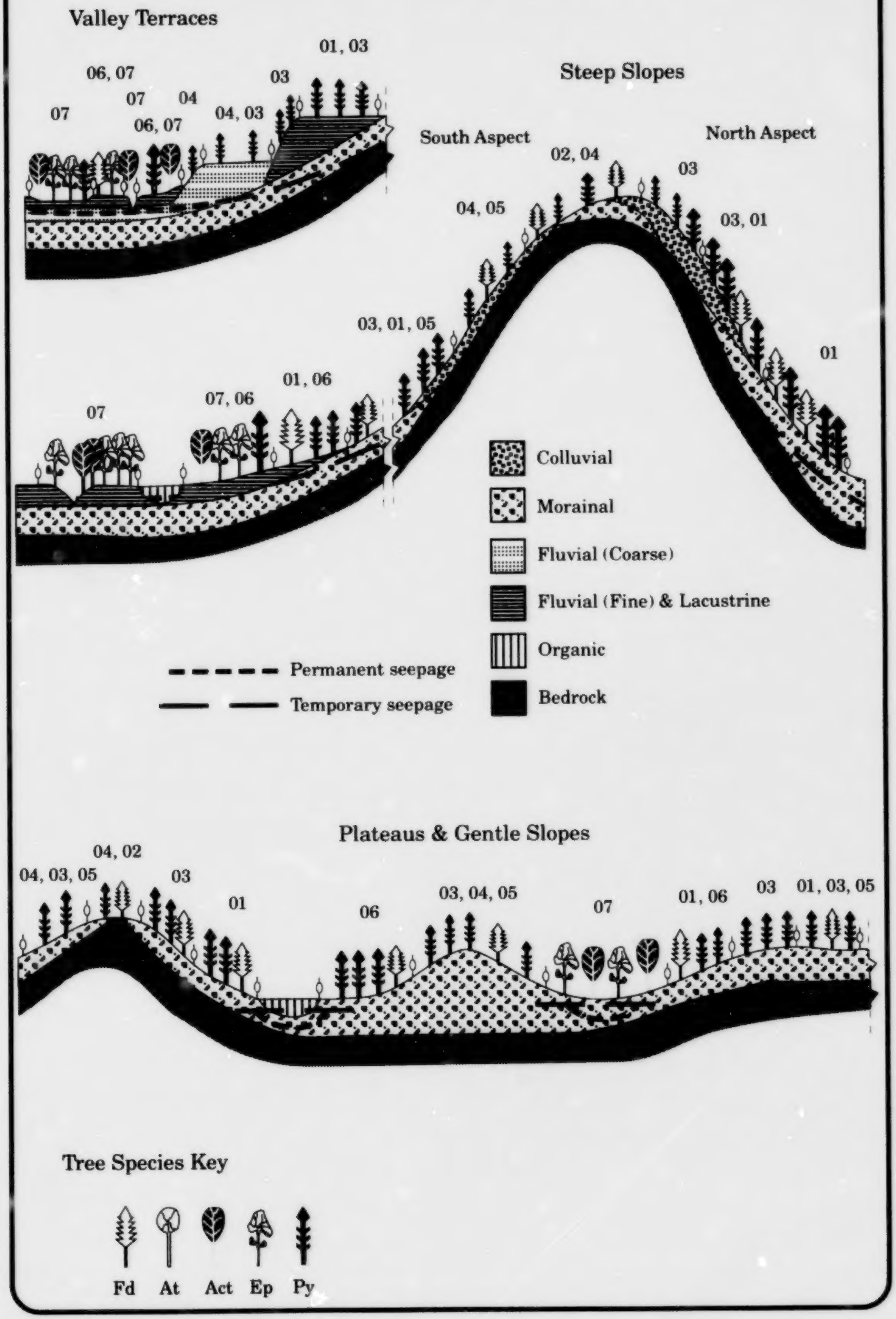
BGC Features: The PP zone is distinguished from all other zones by the presence of open stands of Py with an understory of bluebunch wheatgrass. The absence of pinegrass on zonal sites distinguishes the PP zone from the adjacent IDF zone. The PPxh2 differs from the PPxh1 by the lack of arrow-leaved balsamroot and Idaho fescue.

Comments: The PPBG zone (Krajina 1969) has been subdivided to form the PP and BG zones. The PP zone is a mosaic of grassland and forest communities.



02	FdPy — Bluebunch wheatgrass — Selaginella
03	Py — Bluebunch wheatgrass
04	Py — Big sage — Bluebunch wheatgrass
05	Big sage — Bluebunch wheatgrass — Fescue
Zonal 01	Py — Bluebunch wheatgrass — Fescue
06	FdPy — Snowberry — Saskatoon
07	Act — Water birch

PP xh2


Valley Terraces

Steep Slopes

Plateaus & Gentle Slopes

Tree Species Key

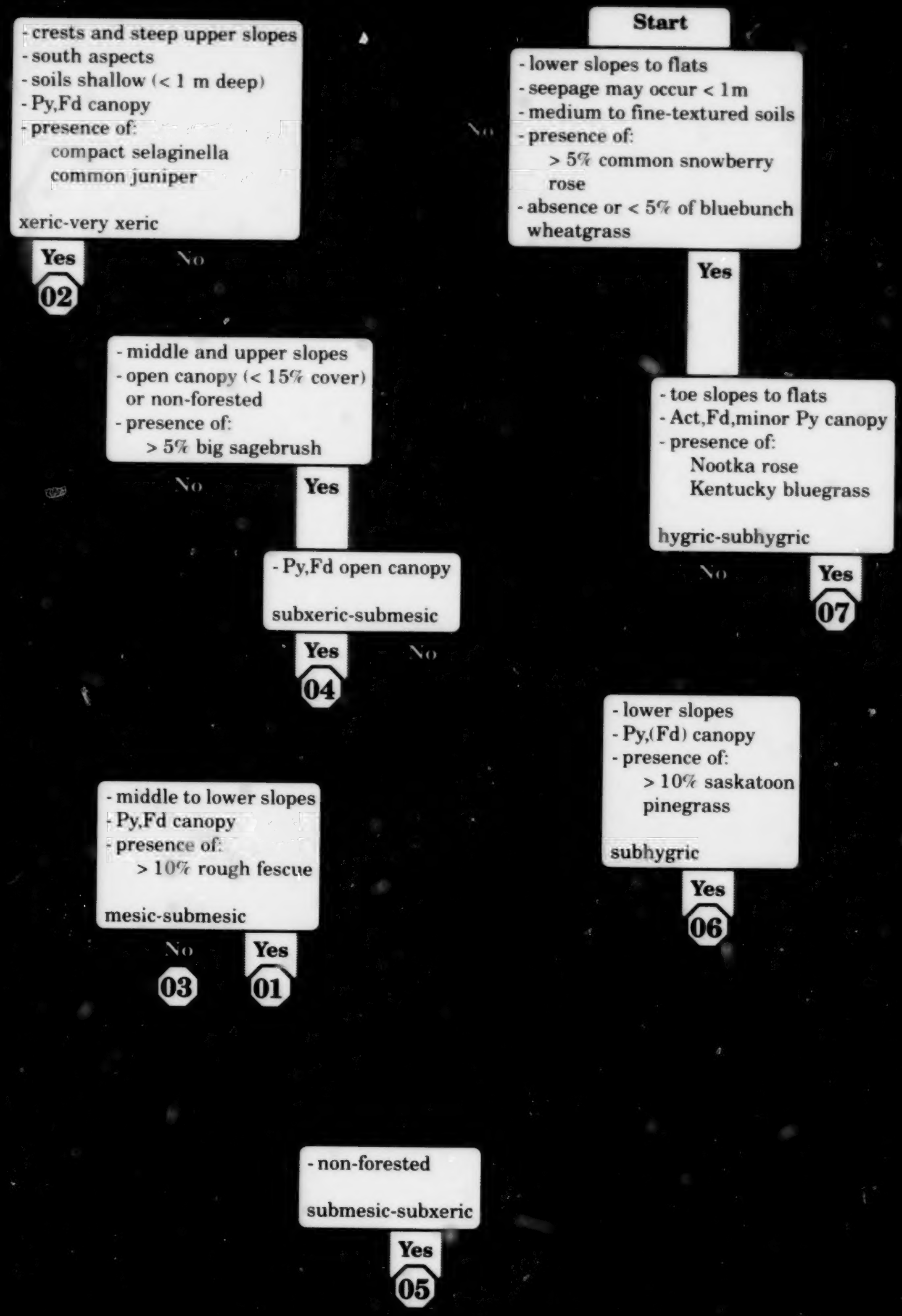
PP xh2 Vegetation Table

	Site Units	02	03	04	05	01	06	07	
Trees	*Pseudotsuga menziesii* var. *glauca*	■		▪		■	■	▪	interior Douglas-fir
	Pinus ponderosa	■	▬	■		▬	▬		ponderosa pine
	Populus balsamifera							▬	black cottonwood
Shrubs	*Spiraea betulifolia*	▪							birch-leaved spirea
	Juniperus communis	▪							common juniper
	Chrysothamnus nauseosus	▪		▪		▪			rabbit-brush
	Symphoricarpos albus						▬	▬	common snowberry
	Artemisia tridentata			▬	▬				big sagebrush
	Artemisia frigida				▪				pasture sage
	Amelanchier alnifolia	▪	▪			▪	▬		saskatoon
	Shepherdia canadensis						▪		soopolallie
	Prunus emarginata						▪		bitter cherry
	Mahonia aquifolium						▪		tall Oregon-grape
	Rosa spp.						▪	▬	roses
	Betula occidentalis							▬	water birch
	Alnus incana							▪	mountain alder
Herbs	*Selaginella densa*	▬			▪				compact selaginella
	Artemisia dracunculus	▪							tarragon
	Gaillardia aristata	▪							brown-eyed Susan
	Allium cernuum	▪							nodding onion
	Antennaria umbrinella	▪							umber pussytoes
	Agropyron spicatum	▬	▬	▬	▬	■	▪		bluebunch wheatgrass
	Achillea millefolium	▪	▪	▪	▪	▪	▪		yarrow
	Lithospermum ruderale	▪	▪	▪			▪		lemonweed
	Tragopogon spp.	▪		▪		▪	▪		salsifies
	Festuca scabrella			■	▪	■			rough fescue
	Poa sandbergii		▪	▪	▪				Sandberg's bluegrass
	Koeleria macrantha		▪	▪	■		▪		junegrass
	Astragalus miser		■			▪			timber milk-vetch
	Stipa occidentalis						▪		stiff needlegrass
	Vicia americana						▪		American vetch
	Calamagrostis rubescens						■		pinegrass
	Aster spp.							▪	asters
	Smilacina stellata							■	star-flowered false Solomon's-seal
	Osmorhiza chilensis							▪	sweet-cicely
	Viola canadensis							▪	Canada violet
	Poa pratensis							■	Kentucky bluegrass

PP xh2 Environment Table

Site Units	02	03	04	05	01 **Zonal**	06	07
Soil Moisture Regime	X-VX	SM-SX	SX-SM	SM	M-SM	SHG	HG-SHG
Prevailing Successional Stage Sampled	Young Climax						
Aspect	South	All				N/A	
Slope Gradient & Mesoslope Position	Gentle - steep Crest & upper	Gentle Middle - upper		Gentle - steep Middle	Gentle Middle	Gentle Lower	Gentle - flat Toe
Soil Texture Class	Medium	Med-Crse	Medium		Medium	Fine	Med-Fine
Parent Materials	Ev/R	Mb,FGt	Mb,Cv/Mb	Cv/Mb	Mb,FGt	Fb	
Important Soil Features	Some L	--------					Some W

PP xh2


Start
- lower slopes to flats
- seepage may occur < 1m
- medium to fine-textured soils
- presence of:
> 5% common snowberry
rose
- absence or < 5% of bluebunch wheatgrass
Yes
No
- toe slopes to flats
- Act,Fd,minor Py canopy
- presence of:
Nootka rose
Kentucky bluegrass
hygric-subhygric
Yes
07
No
- lower slopes
- Py,(Fd) canopy
- presence of:
> 10% saskatoon
pinegrass
subhygric
Yes
06
- crests and steep upper slopes
- south aspects
- soils shallow (< 1 m deep)
- Py,Fd canopy
- presence of:
compact selaginella
common juniper
xeric-very xeric
Yes
02
No
- middle and upper slopes
- open canopy (< 15% cover) or non-forested
- presence of:
> 5% big sagebrush
No
Yes
- Py,Fd open canopy
subxeric-submesic
Yes
04
No
- middle to lower slopes
- Py,Fd canopy
- presence of:
> 10% rough fescue
mesic-submesic
No
03
Yes
01
- non-forested
submesic-subxeric
Yes
05

THOMPSON DRY COOL
INTERIOR DOUGLAS-FIR VARIANT

Distribution: The IDFdk1 variant occurs at lower elevations of the central Thompson Plateau, Clear Range and the Similkameen and Ashnola drainages. It occurs above either the IDFxh1a or IDFxh2 and below the MSxk.

Elevational Range (Mean): 1130-1460 m

Climate: The IDF is characterized by a warm, dry climatic regime with a relatively long growing season in which moisture deficits are common. The IDFdk is the coldest IDF subzone in the KFR. It receives more precipitation than the IDFxh and less than the IDFmw. The IDFdk1 is cooler and drier than the IDFdk2.

Vegetation and Soils

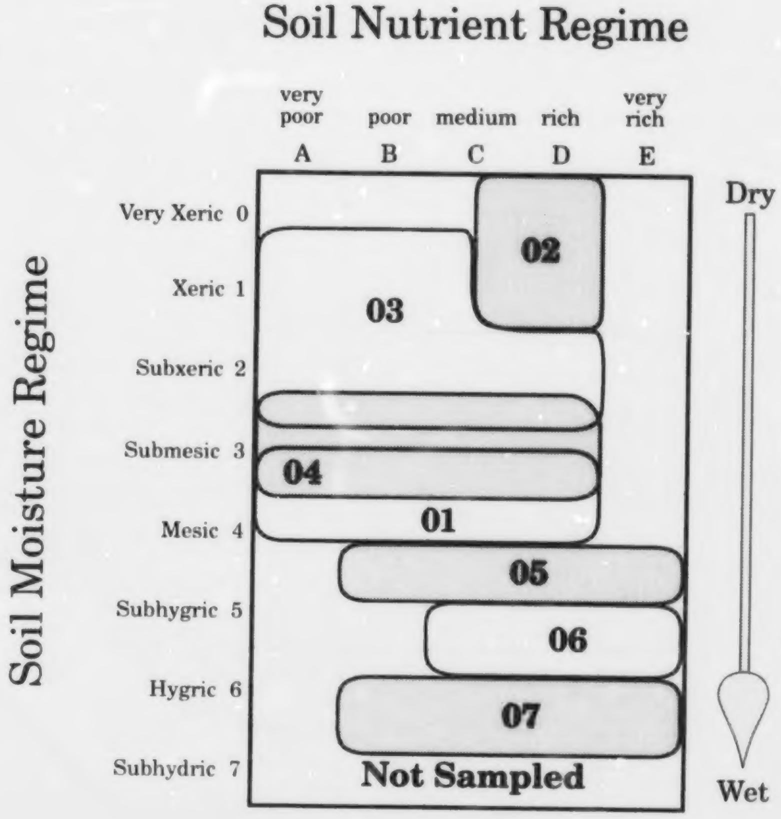
Zonal Sites: Mature climax stands consist of Fd, with Pl as a seral species. The herb-dominated understory has a high cover of pinegrass and lesser amounts of birch-leaved spirea, soopolallie, twinflower and kinnikinnick. The moss layer is poorly represented and consists largely of red-stemmed feathermoss and lichens. The soils are predominantly Eutric Brunisols, Dystric Brunisols and Gray Luvisols.

Dry Sites: Fd forms open mature climax stands on steep south-facing slopes, with an open understory containing common snowberry and bluebunch wheatgrass. The moss layer is sparse.

Wet Sites: These mature climax sites are characterized by open stands of Sxw. The mixed shrub-herb dominated understory is characterized by black gooseberry, red-osier dogwood, and a high cover of common horsetail. The moss layer is patchy.

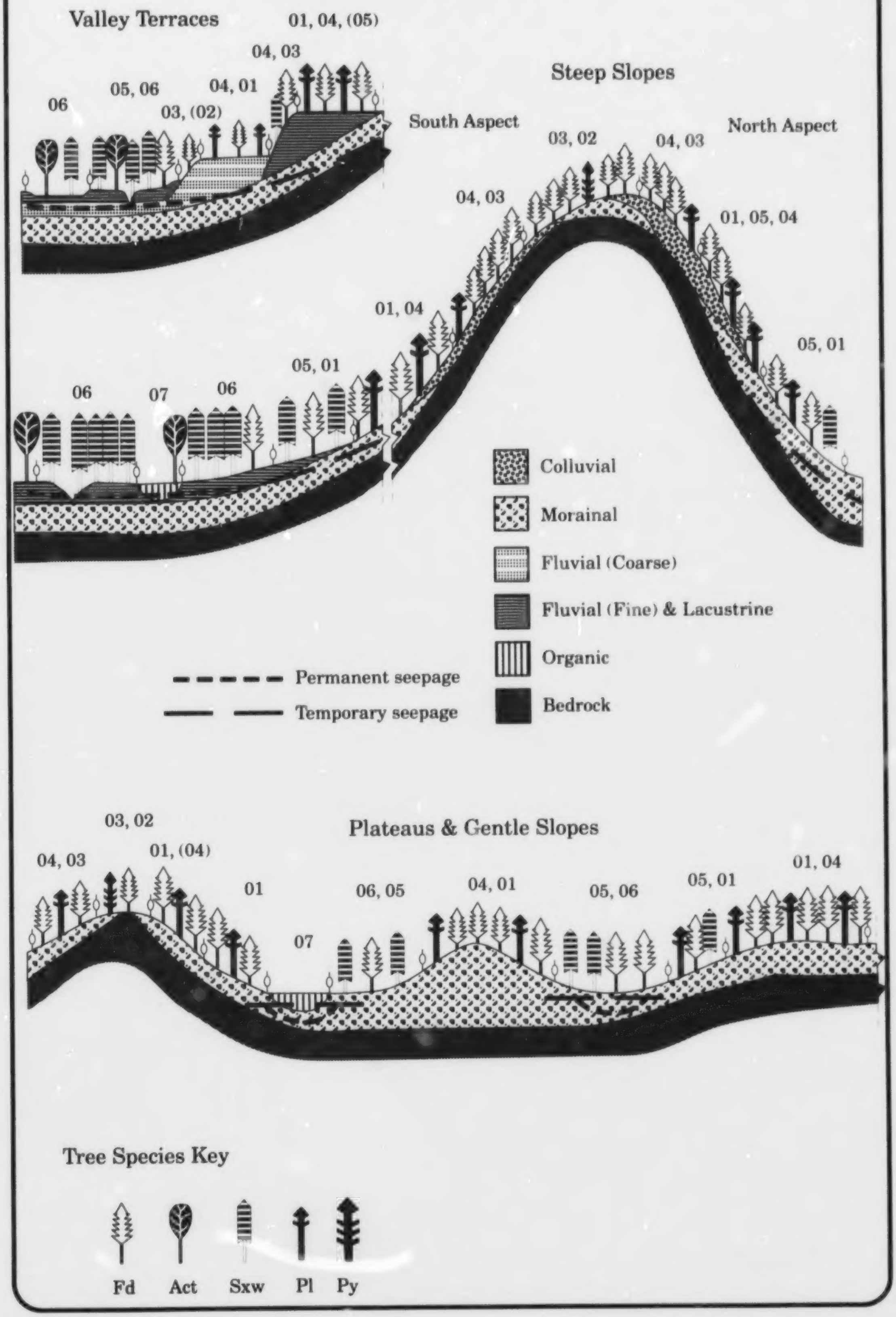
BGC Features: The IDF is distinguished from the other zones by the presence of climax stands of Fd with an understory of pinegrass. The IDFdk is separated from the other IDF subzones by the lack of Py, Lw and Cw. The IDFdk1 lacks falsebox, prince's pine and one-sided wintergreen. These species characterize the IDFdk2.

Comments: The IDFdk1 contains a number of small topoedaphic and edaphic grassland communities which are described in the IDFdk1a.



02	Fd — Snowberry — Bluebunch wheatgrass
03	Fd — Juniper — Pinegrass
04	Fd — Pinegrass — Yarrow
Zonal 01	FdPl — Pinegrass — Feathermoss
05	SxwFd — Gooseberry — Feathermoss
06	Sxw — Horsetail
07	Willow — Sedge

IDF dk1


Valley Terraces
01, 04, (05)
04, 03
04, 01
05, 06
03, (02)
06
Steep Slopes
South Aspect
North Aspect
03, 02
04, 03
04, 03
01, 05, 04
01, 04
05, 01
05, 01
06
07
06
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 02
04, 03
01, (04)
01
07
06, 05
04, 01
05, 06
05, 01
01, 04
Tree Species Key
Fd
Act
Sxw
Pl
Py

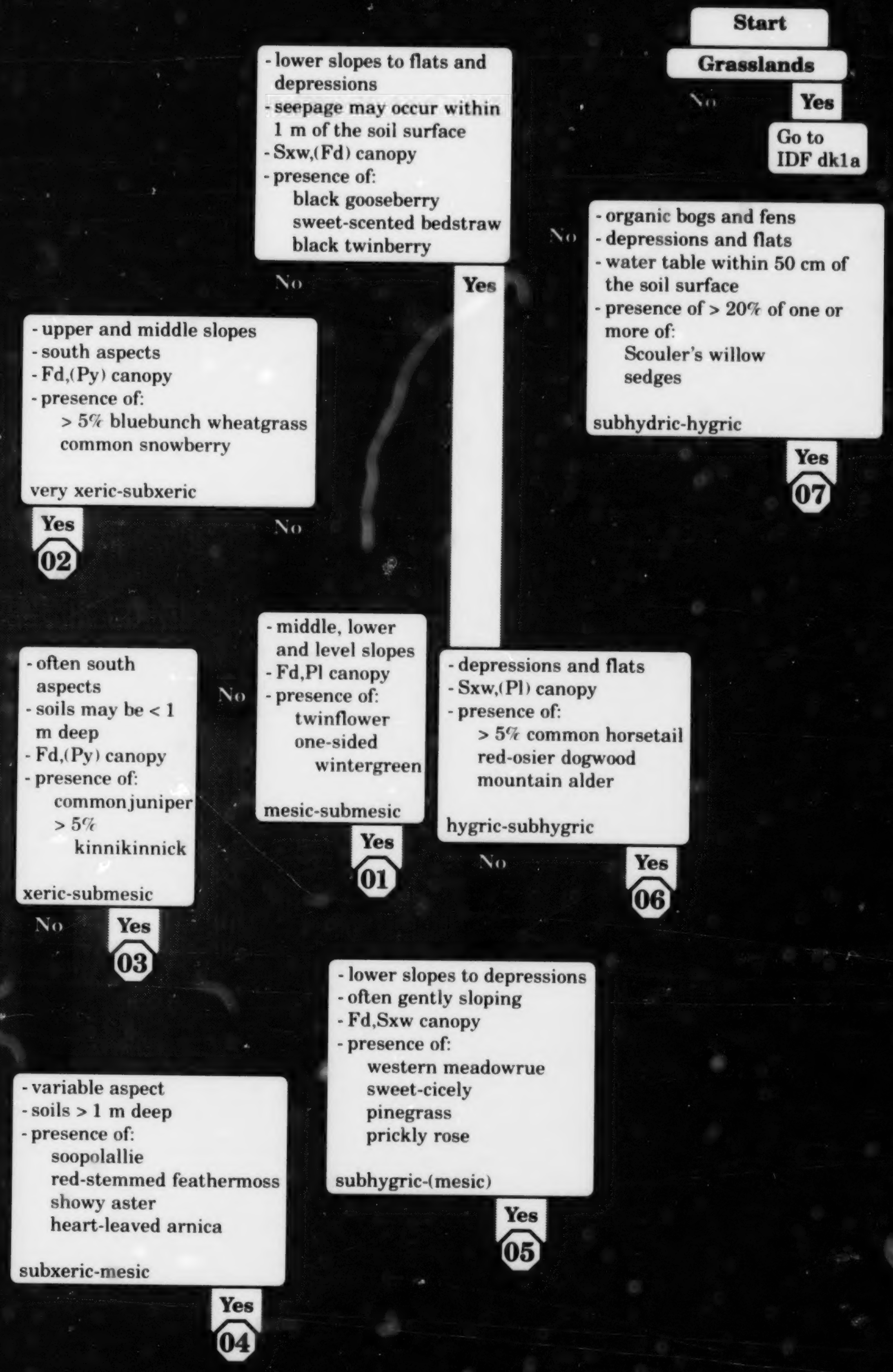
IDF dk1 Vegetation Table

	Site Units	02	03	04	01	05	06	07	
Trees	*Pseudotsuga menziesii var.glauca*	▬	▬	▬	▬	▬	▪		interior Douglas-fir
	Pinus contorta			▪	■	▪	▪		lodgepole pine
	Picea engelmannii x glauca					▬	▬		hybrid Engelmann spruce
Shrubs	*Symphoricarpos albus*	■				▪			common snowberry
	Juniperus communis		■						common juniper
	Spiraea betulifolia		▪	▪	▪				birch-leaved spirea
	Shepherdia canadensis			▪	▪				soopolallie
	Rosa acicularis					■			prickly rose
	Ribes lacustre					▪	■		black gooseberry
	Lonicera involucrata					▪	▪		black twinberry
	Alnus incana						▪		mountain alder
	Cornus sericea						■		red-osier dogwood
	Salix scouleriana							■	Scouler's willow
Herbs	*Agropyron spicatum*	▬	▪						bluebunch wheatgrass
	Achillea millefolium		▪	▪					yarrow
	Antennaria racemosa		▪	▪					racemose pussytoes
	Astragalus miser			▪					timber milk-vetch
	Aster conspicuus			▪					showy aster
	Arnica cordifolia			▪					heart-leaved arnica
	Arctostaphylos uva-ursi		■	▪	▪				kinnikinnick
	Calamagrostis rubescens		▬	▬	▬	■			pinegrass
	Linnaea borealis				■	■	▪		twinflower
	Thalictrum occidentale					▪			western meadowrue
	Osmorhiza chilensis					▪			sweet-cicely
	Galium triflorum					▪			sweet-scented bedstraw
	Cornus canadensis					▪	■		bunchberry
	Equisetum arvense						▬	■	common horsetail
	Carex rostrata							▬	beaked sedge
Mosses & Lichens	*Peltigera aphthosa*				■				lichen
	Pleurozium schreberi			■	■	■	▪		red-stemmed feathermoss
	Brachythecium spp.						■		mosses
	Mnium spp.							▪	leafy mosses

IDF dk1 Environment Table

Site Units	02	03	04	01	05	06	07
				Zonal			
Soil Moisture Regime	VX-SX	SM-X	SX-M	M-SM	SHG-M	HG-SHG	SHD-HG
Prevailing Successional Stage Sampled	Maturing Climax			Maturing Seral		Maturing Climax	Young Climax
Aspect	South	All			N/A		
Slope Gradient & Mesoslope Position	Steep - (gentle) Middle - upper	Gentle - steep Upper & crest	Gentle - steep Middle - upper	Gentle - (steep) Middle & level	Gentle Lower & depression	Flat Depression & level	Flat Depression
Soil Texture Class	Fine	Variable			Fine	Variable	Fine
Parent Materials	Mb,Cb	Mv,(Mb)	Mb,Cv/Mb	Mb	Mb(Fb)	Fb	Ov/Fb,Fb
Important Soil Features	----	L 10-100	--------		Some W	W 25-60	W 10-50

IDF dk1



Go to IDF dk1a

- organic bogs and fens
- depressions and flats
- water table within 50 cm of the soil surface
- presence of > 20% of one or more of:
  - Scouler's willow
  - sedges

subhydric-hygric

- lower slopes to flats and depressions
- seepage may occur within 1 m of the soil surface
- Sxw,(Fd) canopy
- presence of:
  - black gooseberry
  - sweet-scented bedstraw
  - black twinberry

- upper and middle slopes
- south aspects
- Fd,(Py) canopy
- presence of:
  - > 5% bluebunch wheatgrass
  - common snowberry

very xeric-subxeric

- often south aspects
- soils may be < 1 m deep
- Fd,(Py) canopy
- presence of:
  - common juniper
  - > 5% kinnikinnick

xeric-submesic

- middle, lower and level slopes
- Fd,Pl canopy
- presence of:
  - twinflower
  - one-sided wintergreen

mesic-submesic

- depressions and flats
- Sxw,(Pl) canopy
- presence of:
  - > 5% common horsetail
  - red-osier dogwood
  - mountain alder

hygric-subhygric

- lower slopes to depressions
- often gently sloping
- Fd,Sxw canopy
- presence of:
  - western meadowrue
  - sweet-cicely
  - pinegrass
  - prickly rose

subhygric-(mesic)

- variable aspect
- soils > 1 m deep
- presence of:
  - soopolallie
  - red-stemmed feathermoss
  - showy aster
  - heart-leaved arnica

subxeric-mesic

THOMPSON DRY COOL
INTERIOR DOUGLAS-FIR VARIANT, GRASSLAND PHASE

Distribution: The IDFdk1a phase has a limited distribution. It is most extensive at lower elevations on the Douglas Plateau, above the IDFxh2a and below the IDFdk1.

Vegetation and Soils

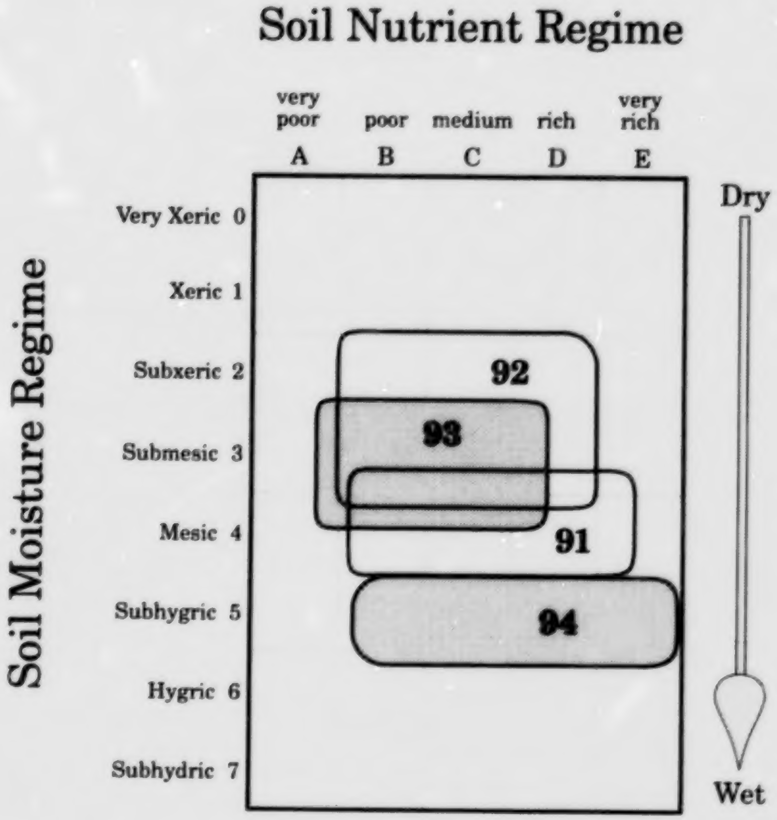
Mesic Sites: These are grasslands within the IDF. They represent edaphic or disclimax plant communities dominated by rough fescue, bluebunch wheatgrass and Kentucky bluegrass. The moss layer is poorly developed.

Dry Sites: A sparse shrub cover of pasture sage and gray horsebrush occurs. A diverse herb layer dominates these sites. Bluebunch wheatgrass is most abundant. There are lesser amounts of Kentucky bluegrass, low pussytoes and silky lupine. There is a low cover of lichens.

Wet Sites: Dense stands of At occur with a shrubby understory of Nootka rose and common snowberry. Kentucky bluegrass is the common herb and the moss layer is sparse.

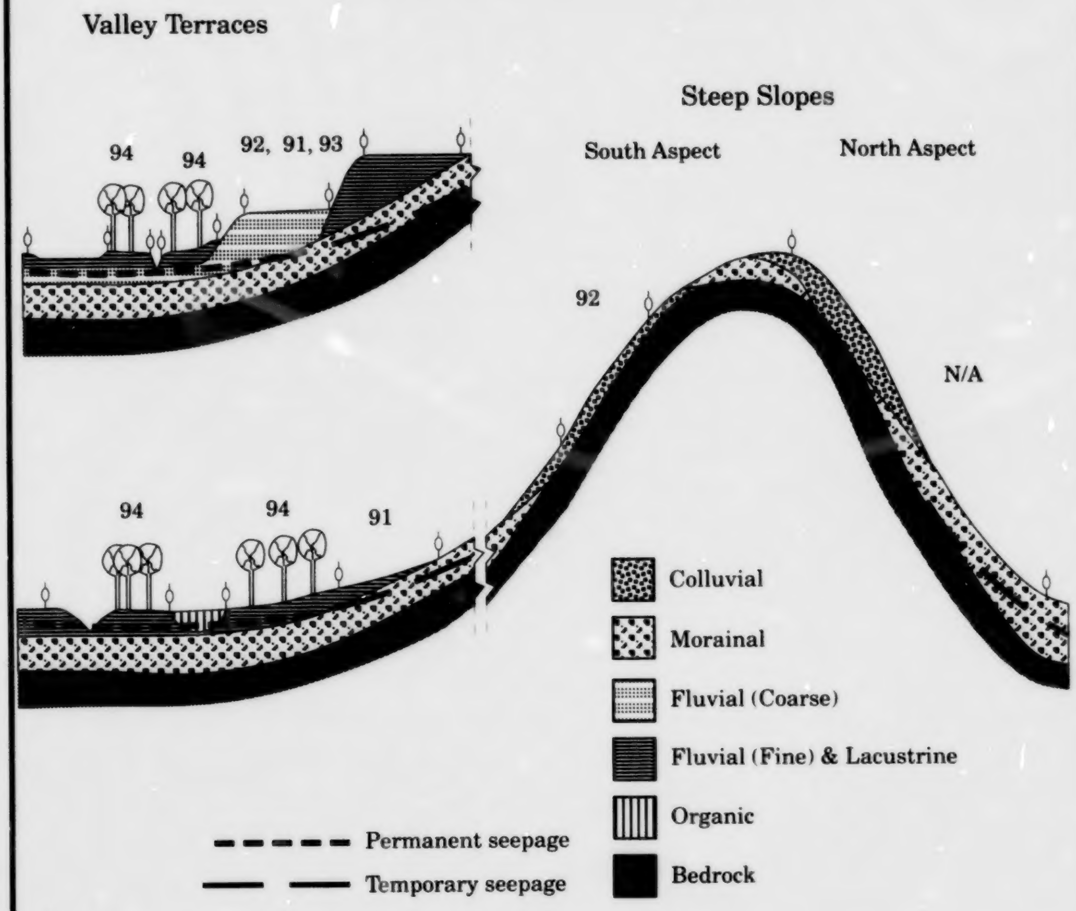
BGC Features: The IDF grassland phases are distinguished from the BG zone by the lack of shrubs and the presence of Idaho or rough fescue.

Comments: The range condition of the IDFdk1 grasslands is generally better than that in the BG zone. These grasslands are commonly referred to as the "upper grasslands" (Nicholson *et al.* 1982).

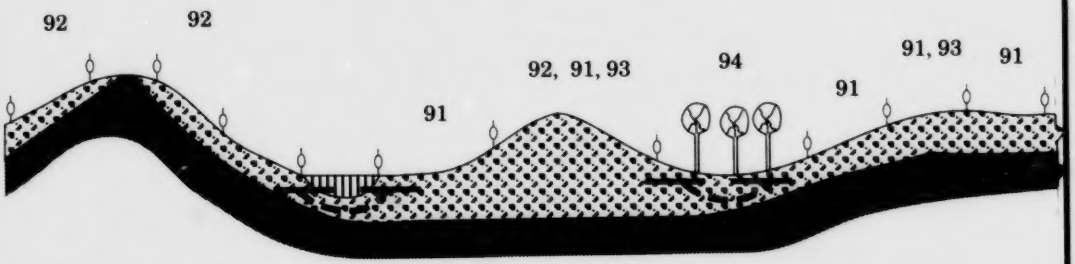


92	Bluebunch wheatgrass — Junegrass
93	Spreading needlegrass
91	Fescue — Bluebunch wheatgrass
94	At — Snowberry — Kentucky bluegrass

IDF dk1a



Plateaus & Gentle Slopes



Tree Species Key

At

Note: Sampling in this phase is incomplete.

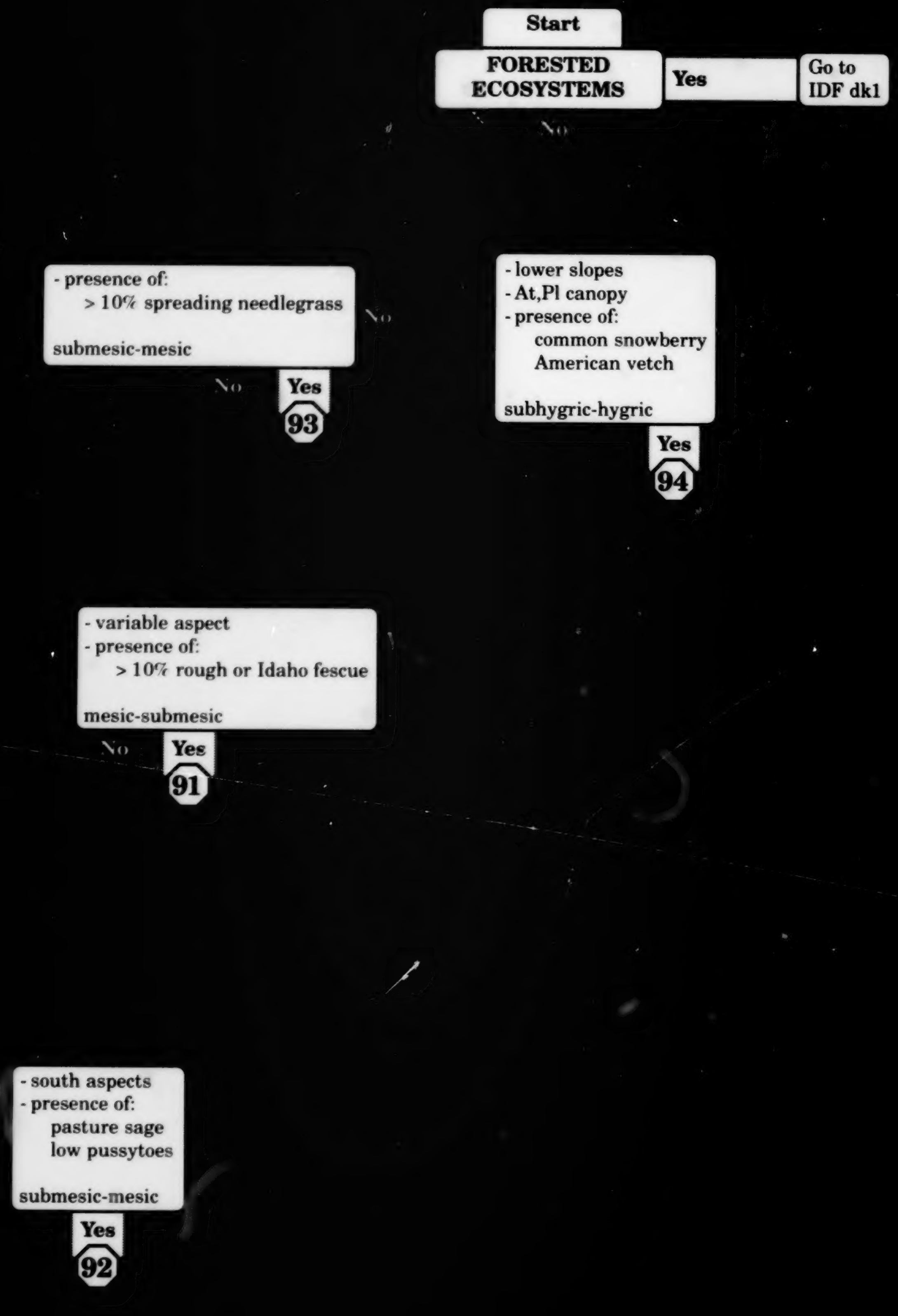
IDF dk1a Vegetation Table

	Site Units	92	93	91	94	
Trees	*Populus tremuloides*				███	trembling aspen
	Pinus contorta				▌	lodgepole pine
Shrubs	*Artemisia frigida*	█				pasture sage
	Rosa nutkana				██	Nootka rose
	Symphoricarpos albus				▌	common snowberry
Herbs	*Antennaria dimorpha*	██				low pussytoes
	Arabis spp.	▌				rockcresses
	Erigeron linearis	▌				line-leaved fleabane
	Antennaria umbrinella	▌				umber pussytoes
	Stipa richardsonii		███			spreading needlegrass
	Agropyron spicatum	███	█	███		bluebunch wheatgrass
	Lupinus sericeus	█		█		silky lupine
	Achillea millefolium	▌	▌	▌		yarrow
	Koeleria macrantha	▌	▌	▌		junegrass
	Festuca scabrella			███		rough fescue
	Festuca idahoensis			▌		Idaho fescue
	Poa pratensis	██	██	██	███	Kentucky bluegrass
	Trifolium spp.				██	clovers
	Poa spp.				█	bluegrasses
	Smilacina stellata				▌	star-flowered false Solomon's-seal
	Vicia americana				▌	American vetch
Mosses	*Tortula ruralis*		▌			moss

IDF dk1a Environment Table

Site Units	92	93	91	94
Soil Moisture Regime	SM-M	SM-M	M-SM	SHG-HG
Prevailing Successional Stage Sampled	Young Seral		Maturing Seral	Young Seral
Aspect	All			N/A
Slope Gradient & Mesoslope Position	Gentle Middle - upper & crest			Gentle - flat Lower & level
Soil Texture Class	Medium - Fine			Fine
Parent Materials		Mb, Mv	Mb,Fb	Mb
Important Soil Features	--------			

IDF dk1a


Start
FORESTED ECOSYSTEMS
Yes
Go to IDF dk1
No
- presence of:
> 10% spreading needlegrass
submesic-mesic
No
No
Yes
93
- lower slopes
- At,Pl canopy
- presence of:
common snowberry
American vetch
subhygric-hygric
Yes
94
- variable aspect
- presence of:
> 10% rough or Idaho fescue
mesic-submesic
No
Yes
91
- south aspects
- presence of:
pasture sage
low pussytoes
submesic-mesic
Yes
92

CASCADE DRY COOL INTERIOR DOUGLAS-FIR VARIANT

Distribution: The IDFdk2 variant occurs on the lee side of the Cascade Mountains and west of Lillooet in the Bridge and Yalakom drainages. A small patch lies at mid-elevations along the North Thompson River between Heffley Creek and Barriere. It also occurs northeast of Princeton, along Hayes and Trout creeks to Summerland. It occurs above the IDFxh1 and below the MSdm2.

Elevational Range (Mean): 600-1300 m

Climate: The IDF zone is characterized by a warm, dry climatic regime with a relatively long growing season in which moisture deficits are common. The IDFdk2 is moister and warmer than the IDFdk1, cooler and moister than the IDFxh, and drier and cooler than the IDFmw.

Vegetation and Soils

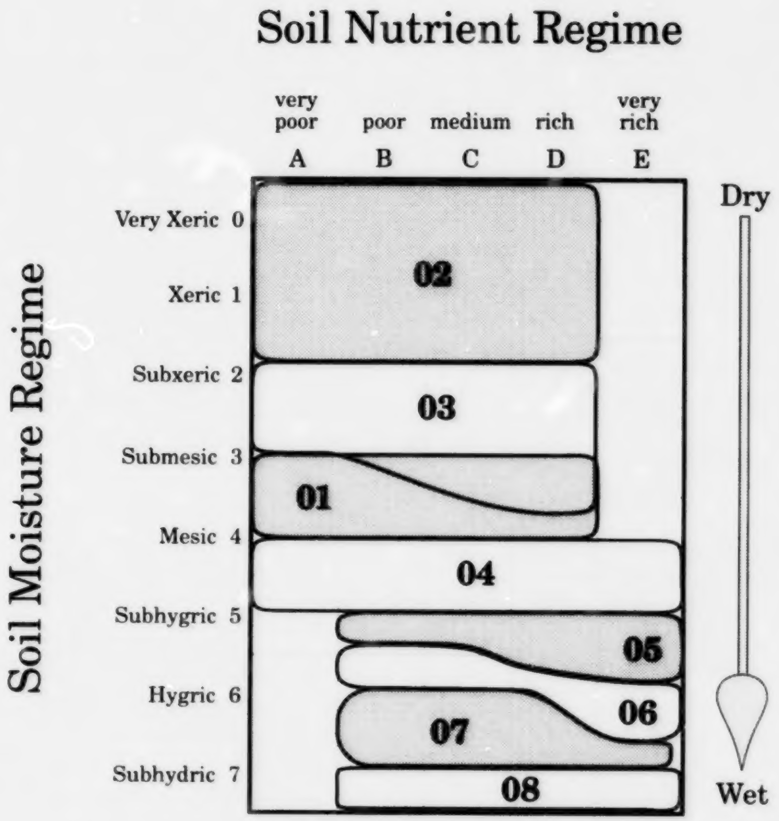
Zonal Sites: Mature seral stands contain Pl with Fd regeneration. Birch-leaved spirea and falsebox form the sparse shrub layer. Pinegrass dominates the understory, with lesser amounts of kinnikinnick and twinflower. Red-stemmed feathermoss forms a discontinuous moss layer. The common soils are Dystric Brunisols, Gray Luvisols and Eutric Brunisols.

Dry Sites: On steep to gentle south-facing slopes, Fd forms mature climax stands. These stands are open, with a sparse understory of saskatoon, birch-leaved spirea and bluebunch wheatgrass. The moss layer is poorly developed. Py may occur on lower elevation, south slopes.

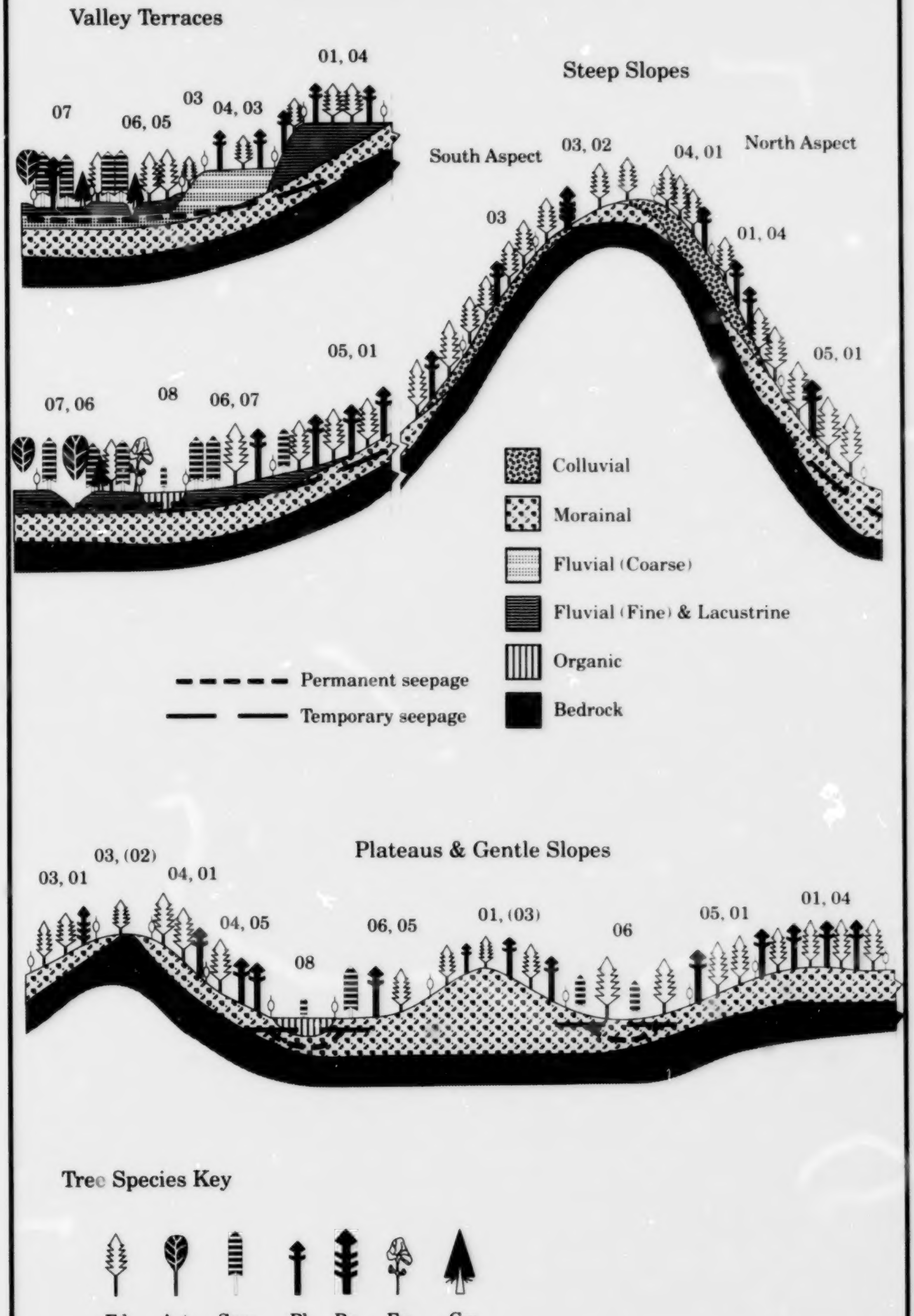
Wet Sites: Sxw forms mature climax stands, with Pl, Fd and Act as a seral component. The understory is diverse; red-osier dogwood is the constant shrub, but no single herb dominates. The bryophyte layer is poorly developed. On wetter sites, Cw and Ep are common, along with a shrubby understory and a dense cover of sedges.

BGC Features: The IDF is distinguished from the other zones by climax stands of Fd with a pinegrass understory. The IDFdk is separated from the IDFxh1 by the presence of Pl and lack of Py. The presence of falsebox, prince's pine and one-sided wintergreen in the IDFdk2 separates it from the IDFdk1. Lw is present in the IDFdm1, but not in the IDFdk2.

IDF dk2



02	FdPy — Bluebunch wheatgrass — Pinegrass
03	FdPy — Pinegrass
Zonal 01	FdPl — Pinegrass — Feathermoss
04	Fd — Feathermoss
05	SxwFd — Dogwood — Gooseberry
06	Sxw — Horsetail
07	CwSxw — Twinberry — Soft-leaved sedge
08	Willow — Sedge


Valley Terraces
07
06, 05
03
04, 03
01, 04
Steep Slopes
South Aspect
03, 02
04, 01
North Aspect
03
01, 04
07, 06
08
06, 07
05, 01
05, 01
▩ Colluvial
▩ Morainal
▨ Fluvial (Coarse)
▤ Fluvial (Fine) & Lacustrine
▥ Organic
■ Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 01
03, (02)
04, 01
04, 05
08
06, 05
01, (03)
06
05, 01
01, 04
Tree Species Key
Fd
Act
Sxw
Pl
Py
Ep
Cw

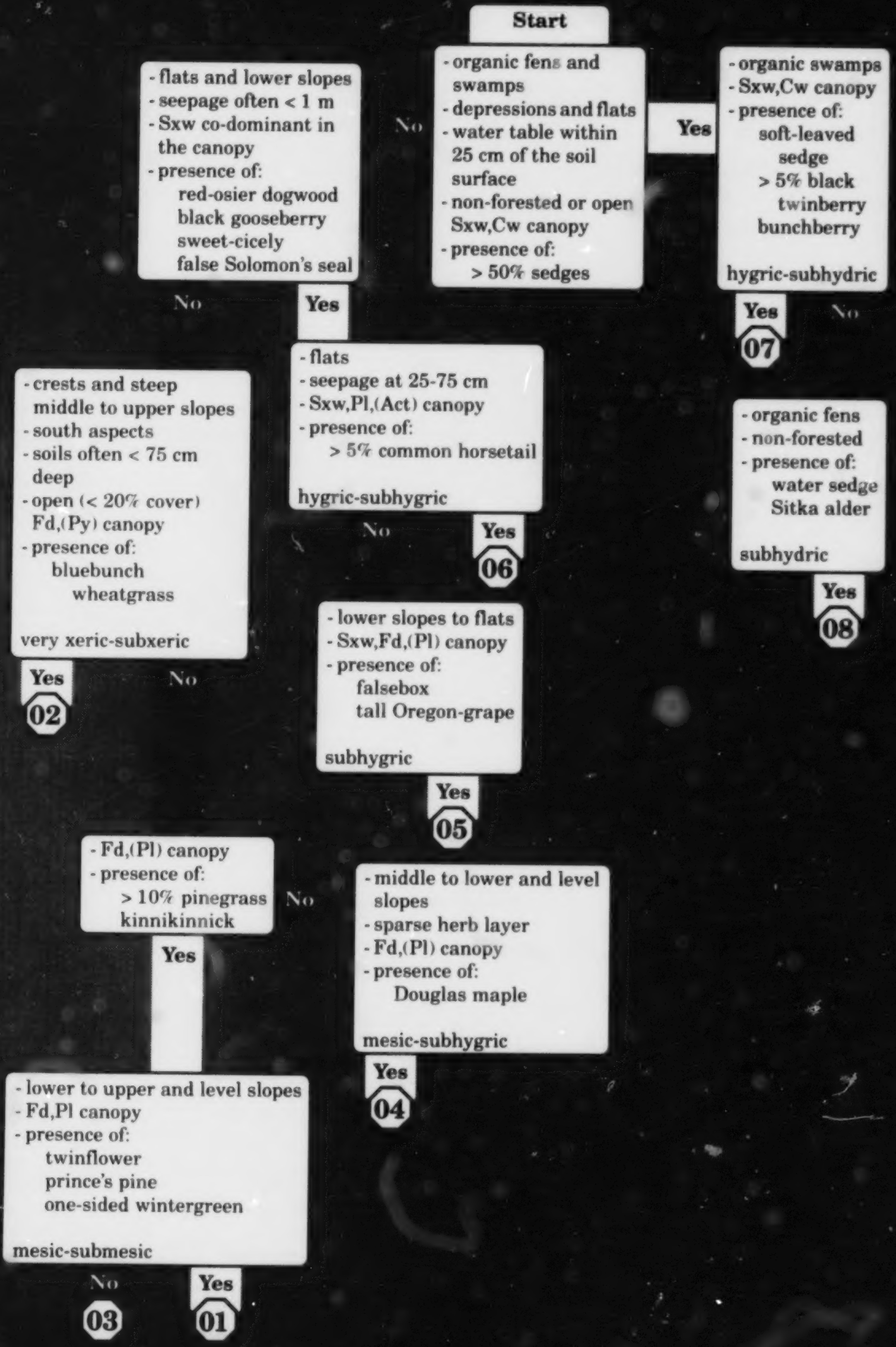
IDF dk2 Vegetation Table

	Site Units	02	03	01	04	05	06	07	08	
Trees	*Pseudotsuga menziesii var.glauca*	■	▬	▬	▬	■	▮			interior Douglas-fir
	Pinus contorta		▮	■	▮	▮	■			lodgepole pine
	Picea engelmannii x glauca					▬	▬	▬	■	hybrid white spruce
	Thuja plicata							▬	▮	western redcedar
	Betula papyrifera							■		paper birch
Shrubs	*Juniperus communis*	▮	▮							common juniper
	Amelanchier alnifolia	▮	▮							saskatoon
	Spiraea betulifolia	▮	■	■	■					birch-leaved spirea
	Shepherdia canadensis		▮	■	▮					soopolallie
	Paxistima myrsinites		▮	■	▮	▮				falsebox
	Mahonia aquifolium		▮		▮	▮				tall Oregon-grape
	Acer glabrum				▮	▮				Douglas maple
	Rubus parviflorus					▮				thimbleberry
	Ribes lacustre					▮	▮			black gooseberry
	Cornus sericea					■	■	■	■	red-osier dogwood
	Alnus incana							■		mountain alder
	Lonicera involucrata							■	▮	black twinberry
	Alnus viridis								■	Sitka alder
	Salix spp.								■	willows
Herbs	*Agropyron spicatum*	■								bluebunch wheatgrass
	Calamagrostis rubescens	▮	▬	▬						pinegrass
	Arctostaphylos uva-ursi	▮	▮	■						kinnikinnick
	Chimaphila umbellata			▮						prince's pine
	Orthilia secunda			▮	▮	▮	▮			one-sided wintergreen
	Linnaea borealis			■	▮	▮	▮	▮		twinflower
	Osmorhiza chilensis					▮	▮			sweet-cicely
	Smilacina racemosa					▮	▮			false Solomon's-seal
	Petasites palmatus						▮			palmate coltsfoot
	Equisetum arvense						▬			common horsetail
	Cornus canadensis					▮	■	▮		bunchberry
	Carex disperma							▬	▮	soft-leaved sedge
	Carex aquatilis								▬	water sedge
Mosses	*Pleurozium schreberi*			■	■			▮		red-stemmed feathermoss

IDF dk2 Environment Table

Site Units	02	03	01	04	05	06	07	08
			Zonal					
Soil Moisture Regime	VX-SX	SX-SM	M-SM	M-SHG	SHG-(HG)	HG-SHG	HG-SHD	SHD
Prevailing Successional Stage Sampled	Maturing Climax	Young Climax	Maturing Seral	Young Climax	Maturing Seral		Maturing Climax	Young Climax
Aspect	South		All		N/A			
Slope Gradient & Mesoslope Position	Steep - gentle Upper & crest	Steep - gentle Upper - middle	Gentle - (steep) Middle - lower	Steep - gentle Middle - lower	Gentle Lower, toe & level	Flat Level & depression		Flat Depression
Soil Texture Class	Variable					Coarse	Variable	Organic
Parent Materials	Cv/Mv	Cv/Mb,Mb	Mb	Mb,Fb,Cb	Fb, (Mb)	Fb	Ov/Fb	Ob
Important Soil Features	L 10-75	Some L	--------		W 35-100	W 25-75	W 10-35	W 0-25

IDF dk2



- organic fens and swamps
- depressions and flats
- water table within 25 cm of the soil surface
- non-forested or open Sxw,Cw canopy
- presence of:
  - > 50% sedges

- organic swamps
- Sxw,Cw canopy
- presence of:
  - soft-leaved sedge
  - > 5% black twinberry
  - bunchberry

hygric-subhydric

- organic fens
- non-forested
- presence of:
  - water sedge
  - Sitka alder

subhydric

- flats and lower slopes
- seepage often < 1 m
- Sxw co-dominant in the canopy
- presence of:
  - red-osier dogwood
  - black gooseberry
  - sweet-cicely
  - false Solomon's seal

- flats
- seepage at 25-75 cm
- Sxw,Pl,(Act) canopy
- presence of:
  - > 5% common horsetail

hygric-subhygric

- lower slopes to flats
- Sxw,Fd,(Pl) canopy
- presence of:
  - falsebox
  - tall Oregon-grape

subhygric

- crests and steep middle to upper slopes
- south aspects
- soils often < 75 cm deep
- open (< 20% cover) Fd,(Py) canopy
- presence of:
  - bluebunch wheatgrass

very xeric-subxeric

- Fd,(Pl) canopy
- presence of:
  - > 10% pinegrass
  - kinnikinnick

- middle to lower and level slopes
- sparse herb layer
- Fd,(Pl) canopy
- presence of:
  - Douglas maple

mesic-subhygric

- lower to upper and level slopes
- Fd,Pl canopy
- presence of:
  - twinflower
  - prince's pine
  - one-sided wintergreen

mesic-submesic

KETTLE DRY MILD
INTERIOR DOUGLAS-FIR VARIANT

Distribution: The IDFdm1 variant occurs at lower elevations on the east side of the Okanagan Valley from Kelowna to Osoyoos and in the Kettle drainage. It occurs above the IDFxh1 and below the MSdm1 or ICHmk1.

Elevational Range (Mean): 560-1300 m

Climate: The IDF zone is characterized by a warm, dry climatic regime with a relatively long growing season in which moisture deficits are common. The IDFdm1 precipitation regime is transitional between the IDFxh and IDFmw subzones. The climate is cooler and receives less precipitation than the IDFmw, but is wetter than the IDFxh.

Vegetation and Soil

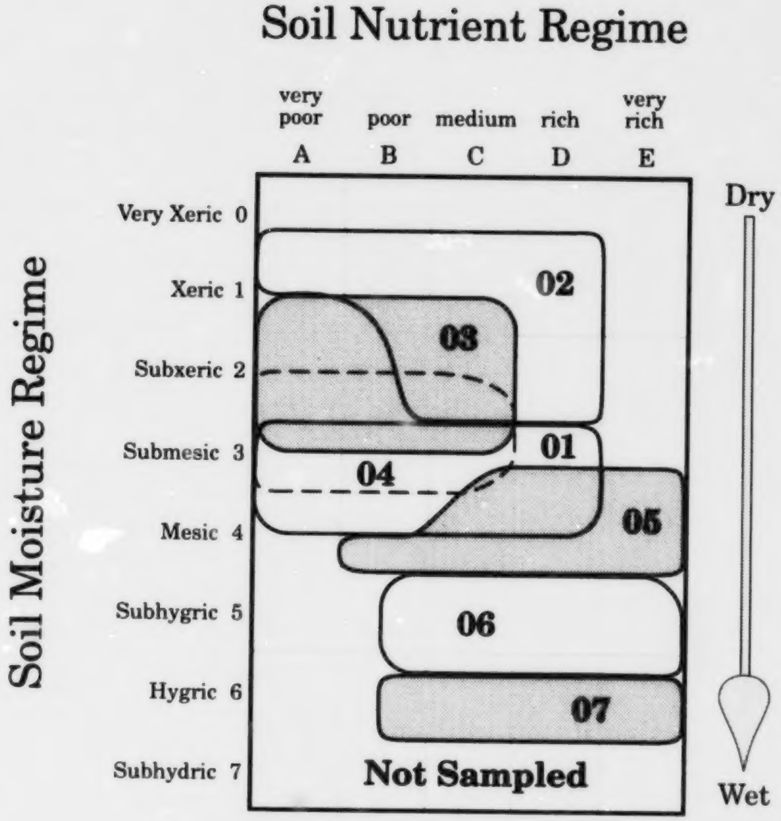
Zonal Sites: Fd is the climax tree species; Pl and Lw are the common seral species. Open, mature seral stands have an herb-dominated understory with birch-leaved spirea, soopolallie and pinegrass, and lesser amounts of kinnikinnick and twinflower. The moss layer is poorly developed.

Dry Sites: In open, mature climax stands, Fd and Py dominate. Bluebunch wheatgrass dominates the understory, with minor amounts of kinnikinnick and pinegrass. The moss layer is poorly developed.

Wet Sites: Sxw dominates open, mature climax stands. Both the shrub and herb layers are species-rich, with red-osier dogwood, thimbleberry, black gooseberry and bunchberry consistently present. Common horsetail and oak fern dominate wetter sites. The bryophyte layer is sparse.

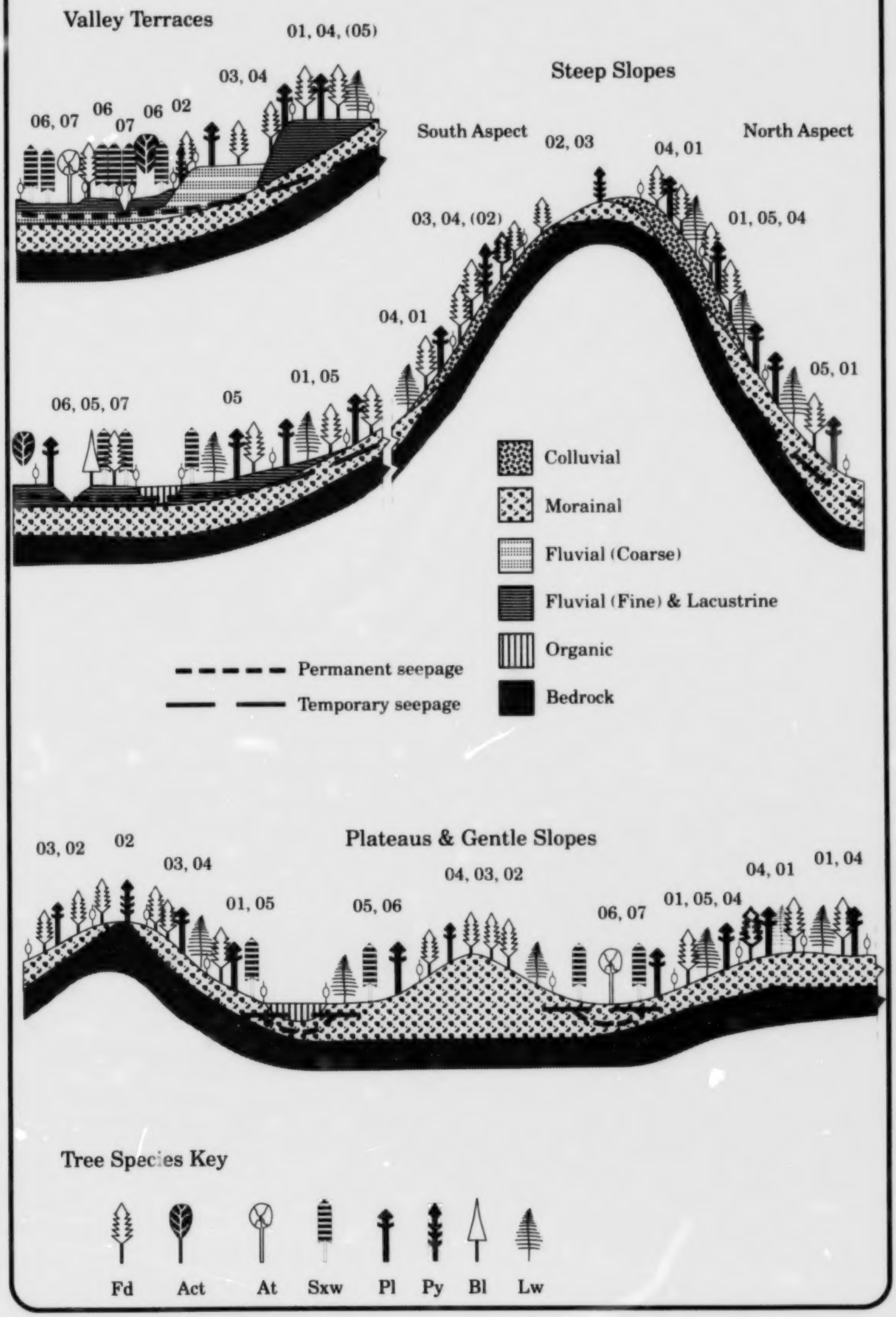
BGC Features: The IDF is distinguished from the other zones by the presence of climax stands of Fd with a pinegrass-dominated understory. The IDFdm1 is separated from the other IDF subzones by the presence of Lw and the lack of Cw.

Comments: Most of the IDFdm1 occurs in the Nelson Forest Region.



02	Bluebunch wheatgrass — Junegrass
03	FdPy — Bluebunch wheatgrass — Pinegrass
04	Fd — Pinegrass — Kinnikinnick
Zonal 01	FdPl — Pinegrass — Twinflower
05	FdLw — Spruce — Pinegrass
06	SxwFd — Dogwood — Gooseberry
07	Sxw — Horsetail

IDF dm1


Valley Terraces
06, 07
06
07
06
02
03, 04
01, 04, (05)
Steep Slopes
South Aspect
02, 03
04, 01
North Aspect
03, 04, (02)
01, 05, 04
04, 01
05, 01
06, 05, 07
05
01, 05
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 02
02
03, 04
01, 05
05, 06
04, 03, 02
06, 07
01, 05, 04
04, 01
01, 04
Tree Species Key
Fd
Act
At
Sxw
Pl
Py
Bl
Lw

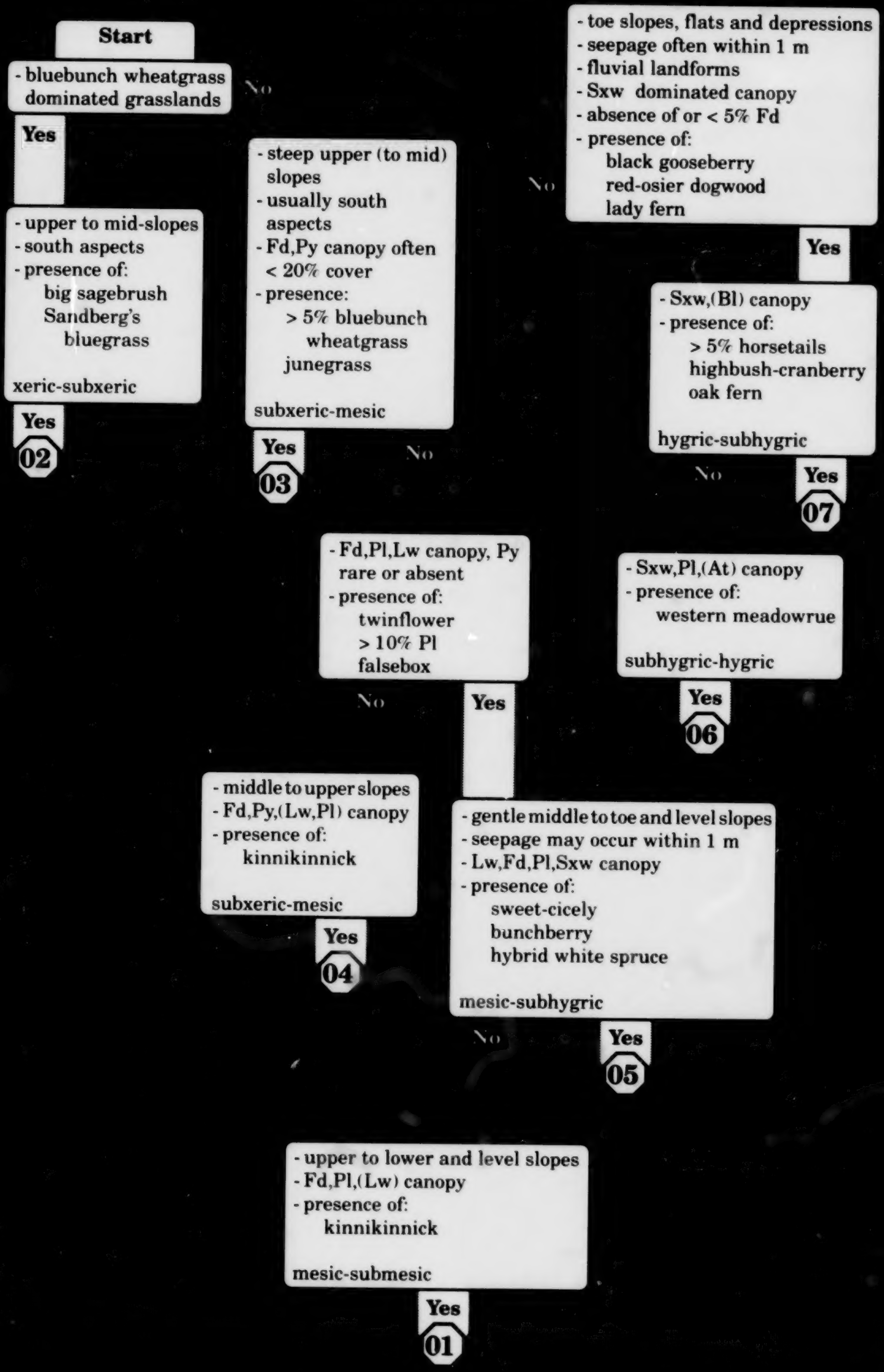
IDF dm1 Vegetation Table

	Site Units	02	03	04	01	05	06	07	
Trees	*Pinus ponderosa*		■	▮					ponderosa pine
	Pseudotsuga menziesii var.glauca		▬	▬▬	▬▬	▬			interior Douglas-fir
	Larix occidentalis			▮	▮	■			western larch
	Pinus contorta			▮	▬	■	▮		lodgepole pine
	Picea engelmannii x glauca					■	▬▬	▬▬	hybrid white spruce
Shrubs	*Juniperus communis*		▮						common juniper
	Artemisia tridentata	▮							big sagebrush
	Spiraea betulifolia		▮	▮	▮	▮			birch-leaved spirea
	Symphoricarpos albus		▮	▮	▮	▮	■	▮	common snowberry
	Shepherdia canadensis			▮	▮				soopolallie
	Amelanchier alnifolia				▮				saskatoon
	Mahonia aquifolium				▮	▮			tall Oregon-grape
	Paxistima myrsinites				▮	▮			falsebox
	Rubus parviflorus					▮	▮	▮	thimbleberry
	Alnus viridis						▮	▮	Sitka alder
	Ribes lacustre						▮	▮	black gooseberry
	Cornus sericea						▬	▬	red-osier dogwood
	Viburnum edule							▮	highbush-cranberry
Herbs	*Lupinus sericeus*	▮	▮						silky lupine
	Bromus tectorum	▮							cheatgrass
	Koeleria macrantha	▮							junegrass
	Achillea millefolium	▮	▮						yarrow
	Agropyron spicatum	▬▬	▬▬						bluebunch wheatgrass
	Arctostaphylos uva-ursi		▬	▬▬	■				kinnikinnick
	Calamagrostis rubescens		■	▬▬	▬▬	▬▬			pinegrass
	Chimaphila umbellata					▮			prince's pine
	Linnaea borealis				■	■	▮	▮	twinflower
	Aralia nudicaulis					▮		▮	wild sarsaparilla
	Osmorhiza chilensis					▮			sweet-cicely
	Cornus canadensis					▮	▮	▮	bunchberry
	Galium triflorum						▮		sweet-scented bedstraw
	Thalictrum occidentale						▮		western meadowrue
	Athyrium filix-femina						▮	▮	lady fern
	Gymnocarpium dryopteris							■	oak fern
	Equisetum arvense							▬▬	common horsetail
Mosses	*Pleurozium schreberi*					▮			red-stemmed feathermoss

IDF dm1 Environment Table

Site Units	02	03	04	01	05	06	07
				Zonal			
Soil Moisture Regime	X-SX	X-SM	SX-M	M-SM	M-SHG	SHG-HG	HG-SHG
Prevailing Successional Stage Sampled	Maturing Seral	Maturing Climax	Maturing Seral			Maturing Climax	
Aspect	South		All		North	All	N/A
Slope Gradient & Mesoslope Position	Steep - gentle Middle - upper	Steep Upper - crest	Gentle - steep Middle - upper	Gentle - (steep) Middle	Gentle - steep Middle - lower	Gentle - flat Lower-toe & level	Flat Level & depression
Soil Texture Class	Variable					Fine	
Parent Materials	Mb,Cv,FGt		Mb,FGt	Mb,Fb	Fb,Cv/Mb	Fb,(Mb)	Mb,Fb
Important Soil Features	Some L		--------			Some W	W 20-75

IDF dm1



Start

- bluebunch wheatgrass dominated grasslands

- upper to mid-slopes
- south aspects
- presence of:
  - big sagebrush
  - Sandberg's bluegrass

xeric-subxeric

- steep upper (to mid) slopes
- usually south aspects
- Fd,Py canopy often < 20% cover
- presence:
  - > 5% bluebunch wheatgrass
  - junegrass

subxeric-mesic

- toe slopes, flats and depressions
- seepage often within 1 m
- fluvial landforms
- Sxw dominated canopy
- absence of or < 5% Fd
- presence of:
  - black gooseberry
  - red-osier dogwood
  - lady fern

- Sxw,(Bl) canopy
- presence of:
  - > 5% horsetails
  - highbush-cranberry
  - oak fern

hygric-subhygric

- Fd,Pl,Lw canopy, Py rare or absent
- presence of:
  - twinflower
  - > 10% Pl
  - falsebox

- Sxw,Pl,(At) canopy
- presence of:
  - western meadowrue

subhygric-hygric

- middle to upper slopes
- Fd,Py,(Lw,Pl) canopy
- presence of:
  - kinnikinnick

subxeric-mesic

- gentle middle to toe and level slopes
- seepage may occur within 1 m
- Lw,Fd,Pl,Sxw canopy
- presence of:
  - sweet-cicely
  - bunchberry
  - hybrid white spruce

mesic-subhygric

- upper to lower and level slopes
- Fd,Pl,(Lw) canopy
- presence of:
  - kinnikinnick

mesic-submesic

SHUSWAP MOIST WARM
INTERIOR DOUGLAS-FIR VARIANT

Disribution: The IDFmw1 variant occurs at low elevations of the Okanagan Highlands on the east side of Okanagan Lake from Peachland to Salmon Arm and encompassing Mission Creek, the Shuswap River, and their tributaries. On the west side of Okanagan Lake, it is found along Shorts, Whiteman, Bouleau and Equesis creeks. It is located above the IDFxh1 and below either the ICHmw2 or ICHmk1.

Elevational Range (Mean): 500-1200 m

Climate: The IDF zone is characterized by a warm, dry climatic regime and a relatively long growing season in which moisture deficits are common. The IDFmw is transitional between the IDF and ICH zones. The IDFmw1 is cooler and slightly drier than the IDFmw2 and has a considerably shorter growing season.

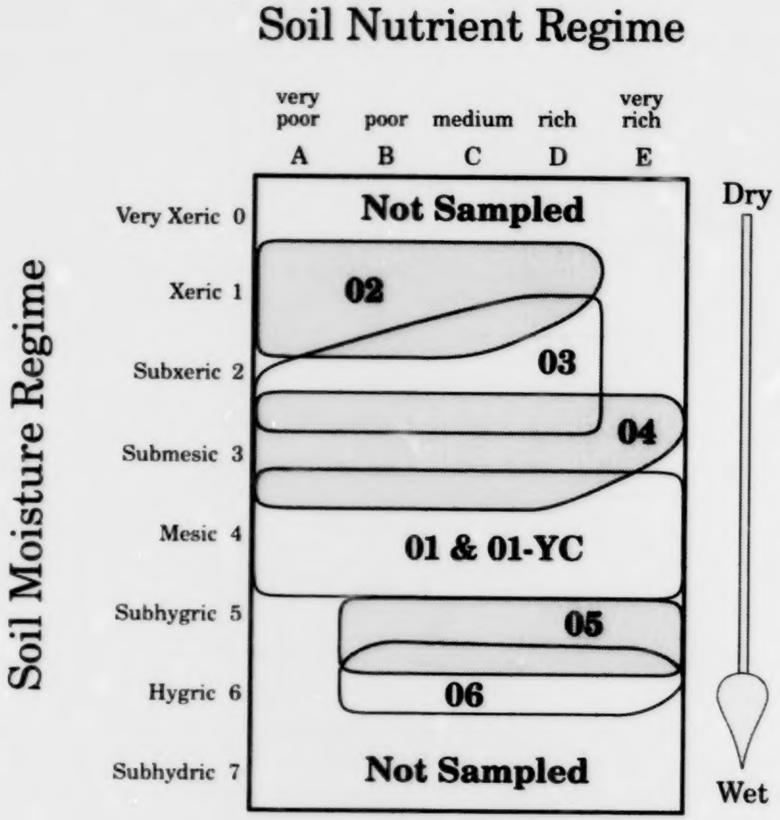
Vegetation and Soils

Zonal Sites: Mature seral stands are composed of Pl, Lw, Ep and the shade-tolerant climax species, Fd and Cw. The understory is diverse. Birch-leaved spirea, falsebox and Douglas maple are the constant shrubs, twinflower and prince's pine are the dominant herbs, and feathermoss forms a discontinous moss layer.

Dry Sites: Fd forms open stands. Py may occur on south-facing slopes. Saskatoon, falsebox, birch-leaved spirea, common snowberry, bluebunch wheatgrass and pinegrass are the common plants in the dense, shrub-herb dominated understory. The moss layer is poorly developed.

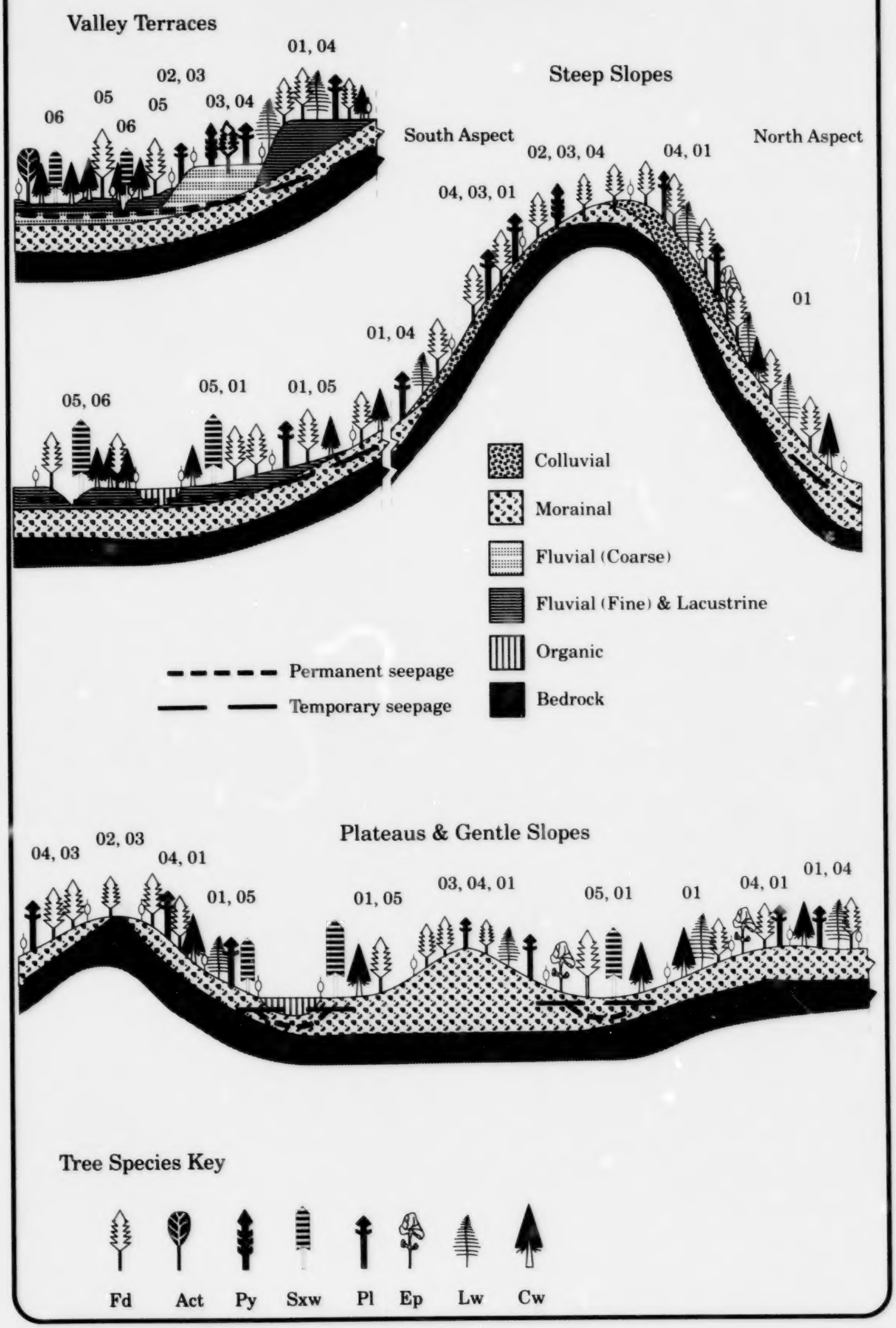
Wet Sites: Mature seral stands consist of Fd, Pl, Lw and the shade-tolerant climax species Cw. Stands are dense, with an open shrub layer consisting of red-osier dogwood, common snowberry, thimbleberry and black gooseberry. Numerous herbs are present and leafy moss forms a poorly developed moss layer. Devil's club commonly occurs on wetter fluvial sites.

BGC Features: The IDF is distinguished from the other zones by climax stands of Fd with an understory of pinegrass. The IDFmw is separated from the other IDF subzones by the presence of Cw and Ep. Lw, ocean-spray and western trumpet honeysuckle are common in the IDFmw1 and absent from the IDFmw2.



02	FdPy — Snowberry — Bluebunch wheatgrass
03	Fd — Penstemon — Pinegrass
04	Fd — Pinegrass — Feathermoss
Zonal 01	FdCw — Falsebox — Prince's pine
01-YC	CwFd — Feathermoss
05	CwFd — Dogwood
06	Cw — Devil's club — Foamflower

IDF mw1


Valley Terraces
06
05
06
05
02, 03
03, 04
01, 04
Steep Slopes
South Aspect
North Aspect
02, 03, 04
04, 01
04, 03, 01
01
01, 04
05, 06
05, 01
01, 05
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
04, 03
02, 03
04, 01
01, 05
01, 05
03, 04, 01
05, 01
01
04, 01
01, 04
Tree Species Key
Fd
Act
Py
Sxw
Pl
Ep
Lw
Cw

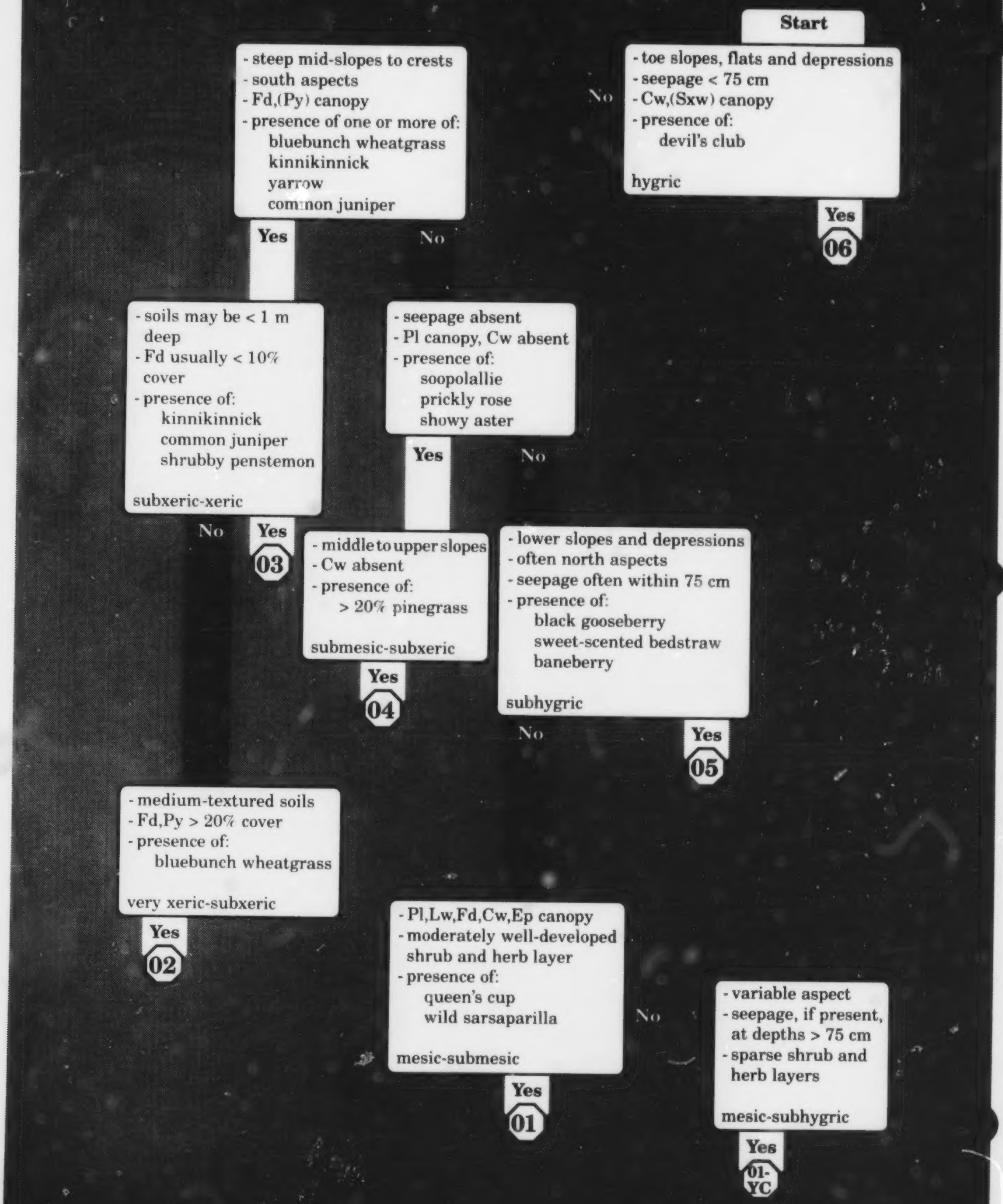
IDF mw1 Vegetation Table

	Site Units	02	03	04	01	01-YC	05	06	
Trees	*Pinus ponderosa*	■	▮						ponderosa pine
	Pseudotsuga menziesii var.*glauca*	▬	■	▬	▬	▬	▬		interior Douglas-fir
	Pinus contorta			■	■	▮			lodgepole pine
	Larix occidentalis			▮	▮		■		western larch
	Betula papyrifera				■	▮			paper birch
	Thuja plicata				▮	▬	▬	▬	western redcedar
	Picea engelmannii x glauca						▮	▮	hybrid white spruce
Shrubs	*Penstemon fruticosus*		▮						shrubby penstemon
	Juniperus communis		▮						common juniper
	Mahonia aquifolium	■	▮	▮	▮				tall Oregon-grape
	Amelanchier alnifolia	▮	■	▮	▮				saskatoon
	Paxistima myrsinites	▮	■	■	■	■			falsebox
	Spiraea betulifolia	▮	■	■	■		▮		birch-leaved spirea
	Symphoricarpos albus	■	▮	▮	▮		■		common snowberry
	Shepherdia canadensis			▮	▮				soopolallie
	Rosa gymnocarpa			▮	▮				baldhip rose
	Acer glabrum			▮	■		▮		Douglas maple
	Rubus parviflorus				▮		■	▮	thimbleberry
	Ribes lacustre						■		black gooseberry
	Cornus sericea						▮	▮	red-osier dogwood
	Oplopanax horridus							▬	devil's club
Herbs	*Achillea millefolium*	▮							yarrow
	Agropyron spicatum	■							bluebunch wheatgrass
	Arctostaphylos uva-ursi		■						kinnikinnick
	Aster conspicuus			▮	▮				showy aster
	Calamagrostis rubescens	■	▬	▬	▮		▮		pinegrass
	Linnaea borealis			▮	▮	▮	▮		twinflower
	Chimaphila umbellata				▮	▮			prince's pine
	Disporum hookeri				▮				Hooker's fairybells
	Aralia nudicaulis						▮		wild sarsaparilla
	Clintonia uniflora						▮		queen's cup
	Osmorhiza chilensis						▮		sweet-cicely
	Viola canadensis						▮		Canada violet
	Galium triflorum						▮	▮	sweet-scented bedstraw
	Actaea rubra						▮	▮	baneberry
	Tiarella unifoliata							▮	one-leaved foamflower
Mosses	*Pleurozium schreberi*			■	■	■			red-stemmed feathermoss
	Rhytidiadelphus triquetrus			▮	▮	▮			electrified cat's-tail moss
	Mnium spp.						▮		leafy mosses

IDF mw1 Environment Table

Site Units	02	03	04	01	01-YC	05	06
				Zonal			
Soil Moisture Regime	VX-SX	SX-X	SM-SX	M-SM	SHG-M	SHG-HG	HG-SHG
Prevailing Successional Stage Sampled	Maturing Seral						Maturing Climax
Aspect	All	South	All			North	N/A
Slope Gradient & Mesoslope Position	Gentle - steep Upper & crest		Gentle Mid.-upp. & level	Gentle Middle & level	Gentle Middle - lower	Gentle - flat Lower & level	Flat Depression & toe
Soil Texture Class	Variable						
Parent Materials	FGt,Mb	Cv,Mb	Variable	FGt,Mb	Mb,FGt	Fb,Mb	Fb (Ov)
Important Soil Features	----	Some L	--------			W 30-75	W 25-75

IDF mw1



- toe slopes, flats and depressions
- seepage < 75 cm
- Cw,(Sxw) canopy
- presence of:
  - devil's club

hygric

- steep mid-slopes to crests
- south aspects
- Fd,(Py) canopy
- presence of one or more of:
  - bluebunch wheatgrass
  - kinnikinnick
  - yarrow
  - common juniper

- soils may be < 1 m deep
- Fd usually < 10% cover
- presence of:
  - kinnikinnick
  - common juniper
  - shrubby penstemon

subxeric-xeric

- seepage absent
- Pl canopy, Cw absent
- presence of:
  - soopolallie
  - prickly rose
  - showy aster

- middle to upper slopes
- Cw absent
- presence of:
  - > 20% pinegrass

submesic-subxeric

- lower slopes and depressions
- often north aspects
- seepage often within 75 cm
- presence of:
  - black gooseberry
  - sweet-scented bedstraw
  - baneberry

subhygric

- medium-textured soils
- Fd,Py > 20% cover
- presence of:
  - bluebunch wheatgrass

very xeric-subxeric

- Pl,Lw,Fd,Cw,Ep canopy
- moderately well-developed shrub and herb layer
- presence of:
  - queen's cup
  - wild sarsaparilla

mesic-submesic

- variable aspect
- seepage, if present, at depths > 75 cm
- sparse shrub and herb layers

mesic-subhygric

THOMPSON MOIST WARM INTERIOR DOUGLAS-FIR VARIANT

Distribution: The IDFmw2 occurs along the transition between the dry and wet belts of the southern Interior. It occupies the valley bottoms and adjacent sidewalls of the North Thompson River valley from Little Fort to Vavenby, and the lower reaches of the Adams, Barriere, Eakin, Clearwater and Raft drainages. It also occurs along Shuswap Lake east of Chase to Magna Bay and Canoe, and south along the Salmon and Shuswap rivers. It is usually found below either the ICHmw3 or ICHmk1 and above the IDFxh2.

Elevational Range (Mean): 335-1100 m

Climate: The IDF zone is characterized by a warm, dry climatic regime with a relatively long growing season in which moisture deficits are common. The IDFmw is transitional between the IDF and ICH zones. The IDFmw2 is warmer, moister and has a longer growing season than the IDFmw1.

Vegetation and Soils

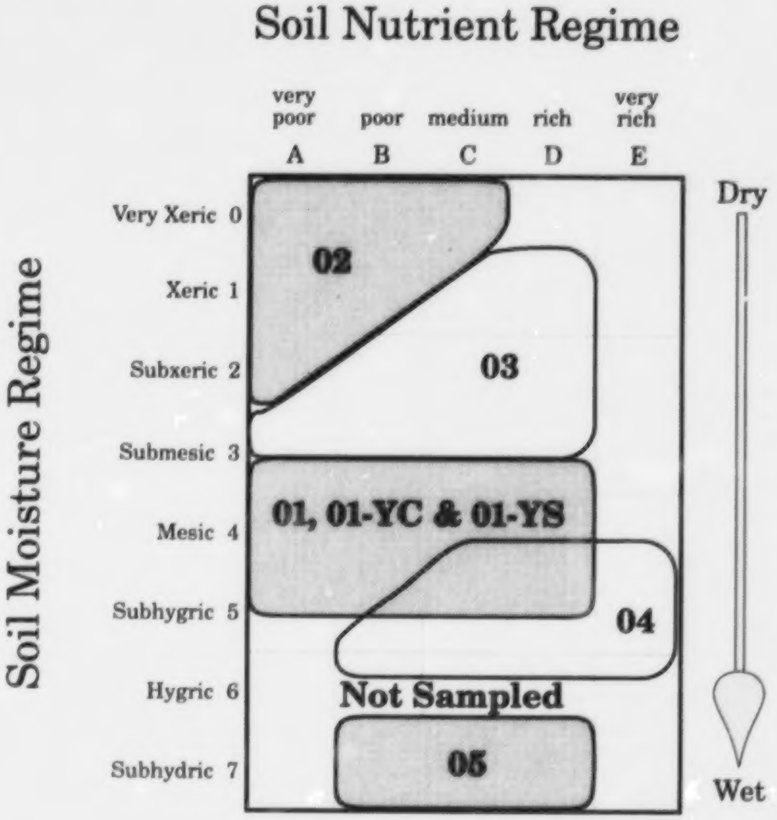
Zonal Sites: Climax stands contain Fd and Cw; successional species are Ep, At and Pl. In young stands, the canopy is often dense and the understory is poorly developed. The shrub and herb layers consist of falsebox, birch-leaved spirea, prince's pine and twinflower. Gray Luvisols and Dystric Brunisols are the common soils.

Dry Sites: A moderate to open tree canopy is formed by Fd in mature climax stands. A sparse understory contains pinegrass and red-stemmed feathermoss. Steep colluvial slopes support bluebunch wheatgrass.

Wet Sites: Cw and Sxw form moderately dense young climax stands with Ep and Fd as the seral species. Oak fern is the common herb in a diverse understory containing thimbleberry, devil's club and red-osier dogwood. A patchy moss layer is present.

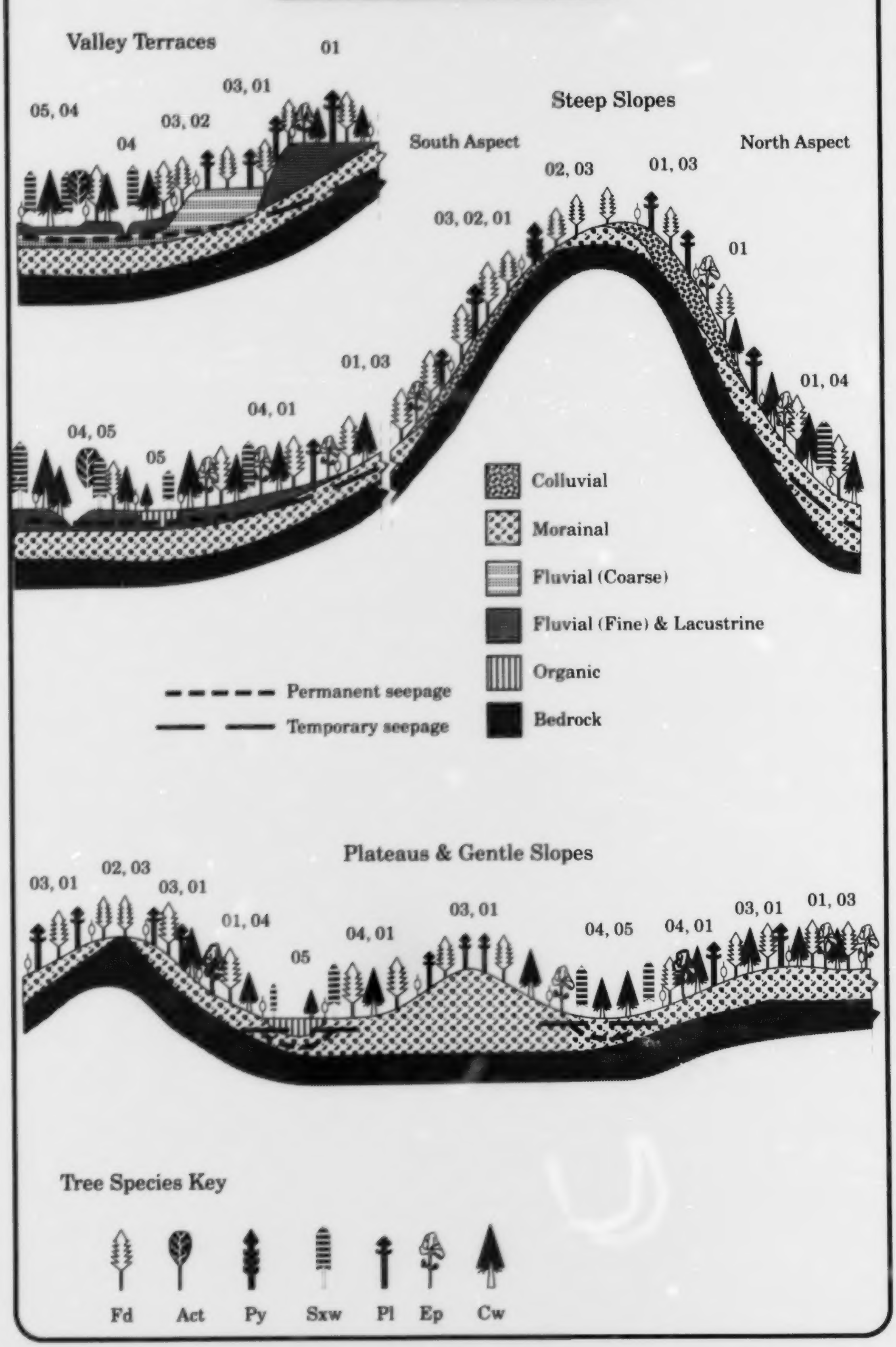
BGC Features: The IDF is distinguished from the other zones by climax stands of Fd with an understory dominated by pinegrass. The IDFmw is separated from the other IDF subzones by the presence of Cw, Ep and Sxw. The lack of Lw, Py, ocean-spray and western trumpet honeysuckle distinguish the IDFmw2 from the IDFmw1.

Comments: Additional sampling of subhygric to hygric sites is required. There are very few climax stands in this subzone.

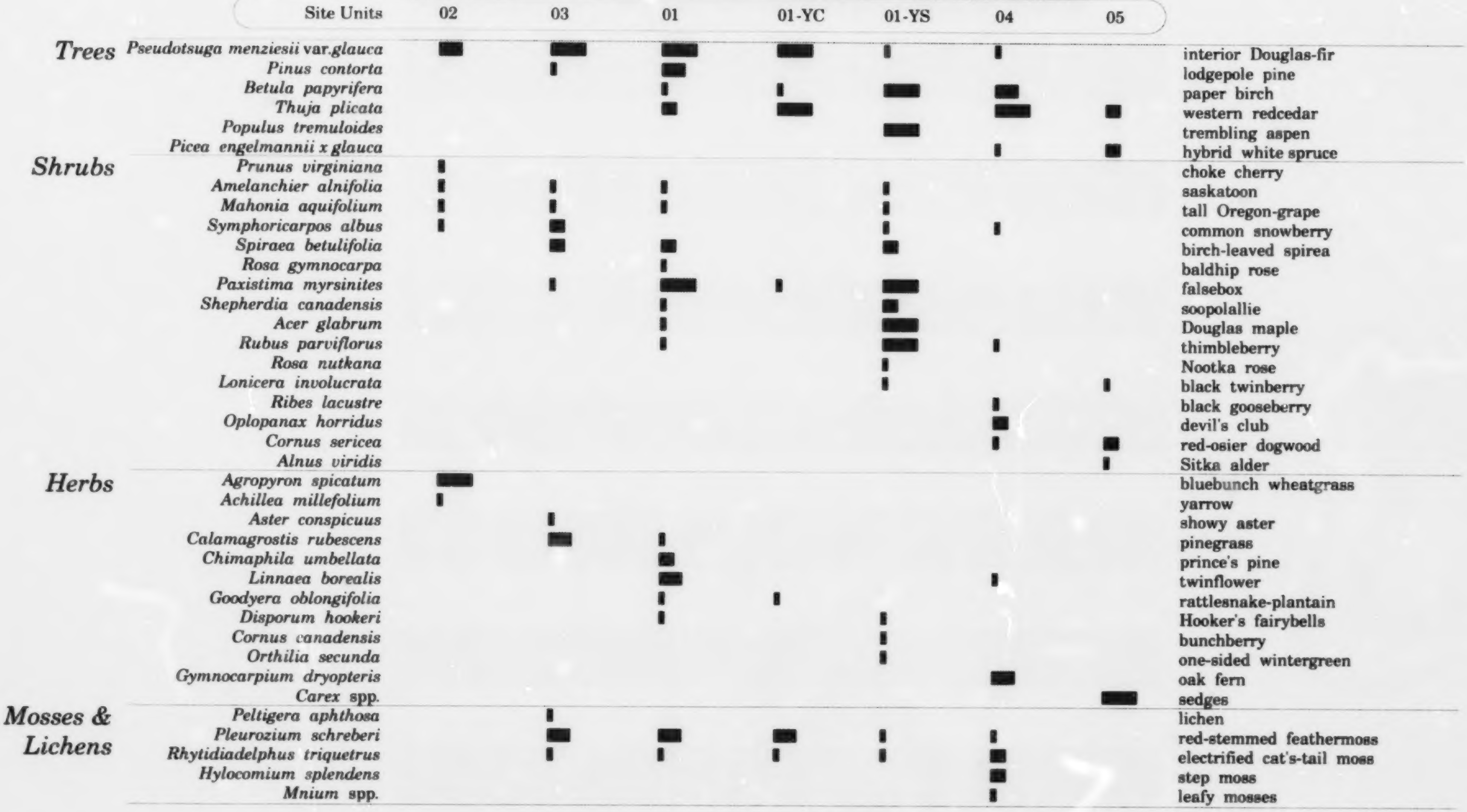


02	Fd — Snowberry — Bluebunch wheatgrass
03	Fd — Pinegrass — Feathermoss
Zonal 01	FdCw — Falsebox — Prince's pine
01-YC	CwFd — Feathermoss
01-YS	EpAt — Thimbleberry — Falsebox
04	CwSxw — Oak fern
05	Dogwood — Sedge

IDF mw2


Valley Terraces
05, 04
04
03, 02
03, 01
01
Steep Slopes
South Aspect
North Aspect
02, 03
01, 03
03, 02, 01
01
01, 03
01, 04
04, 01
04, 05
05
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 01
02, 03
03, 01
01, 04
05
04, 01
03, 01
04, 05
04, 01
03, 01
01, 03
Tree Species Key
Fd
Act
Py
Sxw
Pl
Ep
Cw

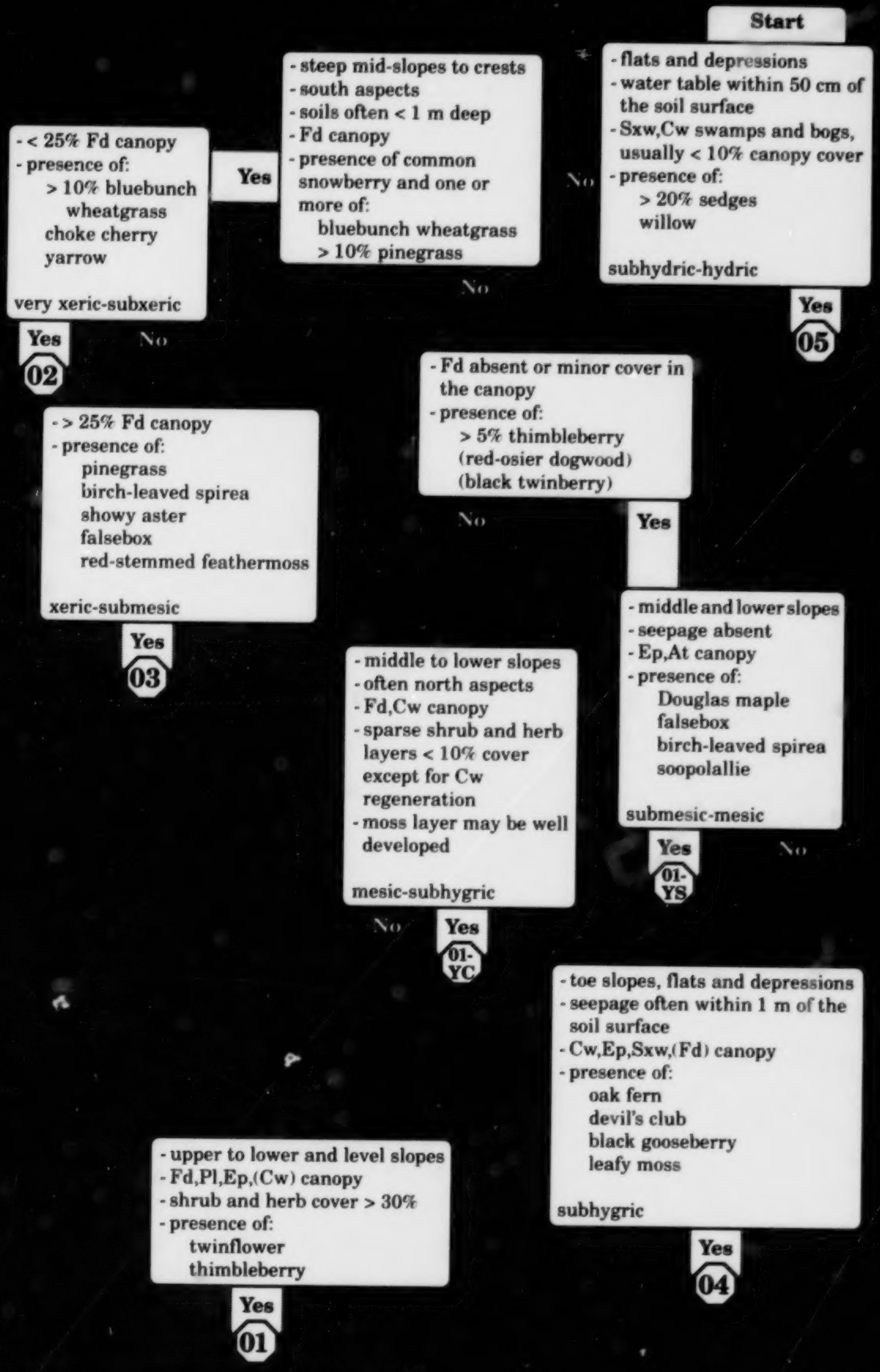
IDF mw2 Vegetation Table



IDF mw2 Environment Table

Site Units	02	03	01	01-YC	01-YS	04	05
			Zonal				
Soil Moisture Regime	VX-SX	X-SM	M-SM	M-(SHG)	SM-M	SHG	SHD-HD
Prevailing Successional Stage Sampled	Maturing Climax		Maturing Seral	Young Climax	Young Seral	Maturing Seral	Young Climax
Aspect	South		All	North	All	N/A	
Slope Gradient & Mesoslope Position	Steep Middle - upper & crest		Steep - gentle Upper - lower & level	Steep Middle - lower	Gentle Middle - lower	Gentle Low., level & depression	Gentle Level & depression
Soil Texture Class	Variable	Coarse	Variable	Medium	Variable		Fine, Org.
Parent Materials	Cv,(FGt)	Mb,(Cb)	Mb,FGt	Mb		Fb,(FGt)	Fb,Ob
Important Soil Features	L 10-55	L 50-90	--------			W 60-85	W 5-45

IDF mw2


Start
- flats and depressions
- water table within 50 cm of the soil surface
- Sxw,Cw swamps and bogs, usually < 10% canopy cover
- presence of:
> 20% sedges
willow
subhydric-hydric
Yes
05
No
- steep mid-slopes to crests
- south aspects
- soils often < 1 m deep
- Fd canopy
- presence of common snowberry and one or more of:
bluebunch wheatgrass
> 10% pinegrass
Yes
- < 25% Fd canopy
- presence of:
> 10% bluebunch wheatgrass
choke cherry
yarrow
very xeric-subxeric
Yes
02
No
No
- Fd absent or minor cover in the canopy
- presence of:
> 5% thimbleberry
(red-osier dogwood)
(black twinberry)
No
Yes
- > 25% Fd canopy
- presence of:
pinegrass
birch-leaved spirea
showy aster
falsebox
red-stemmed feathermoss
xeric-submesic
Yes
03
- middle and lower slopes
- seepage absent
- Ep,At canopy
- presence of:
Douglas maple
falsebox
birch-leaved spirea
soopolallie
submesic-mesic
Yes
01-YS
No
- middle to lower slopes
- often north aspects
- Fd,Cw canopy
- sparse shrub and herb layers < 10% cover except for Cw regeneration
- moss layer may be well developed
mesic-subhygric
No
Yes
01-YC
- toe slopes, flats and depressions
- seepage often within 1 m of the soil surface
- Cw,Ep,Sxw,(Fd) canopy
- presence of:
oak fern
devil's club
black gooseberry
leafy moss
subhygric
Yes
04
- upper to lower and level slopes
- Fd,Pl,Ep,(Cw) canopy
- shrub and herb cover > 30%
- presence of:
twinflower
thimbleberry
Yes
01

OKANAGAN VERY DRY HOT INTERIOR DOUGLAS-FIR VARIANT

Distribution: The IDFxh1 variant occupies lower elevations in the Okanagan Valley, from Enderby to the U.S. border, and west along the Similkameen River to Princeton. It occurs in the valley bottom from the south end of Adam's Lake to Chase, and is found on the lower slopes south and east of Lytton, and west to Seton Lake. The IDFxh1 usually occurs above the PP zone and below either the IDFdk, IDFmw1 or IDFdm.

Elevational Range (Mean): 400-1250 m

Climate: The IDF zone is characterized by a warm, dry climatic regime with a relatively long growing season in which moisture deficits are common. The IDFxh is the warmest and driest forested subzone in the IDF zone. The climate of the IDFxh1 is characterized by warmer temperatures, a longer growing season and less extreme winter temperatures than the IDFxh2.

Vegetation and Soils

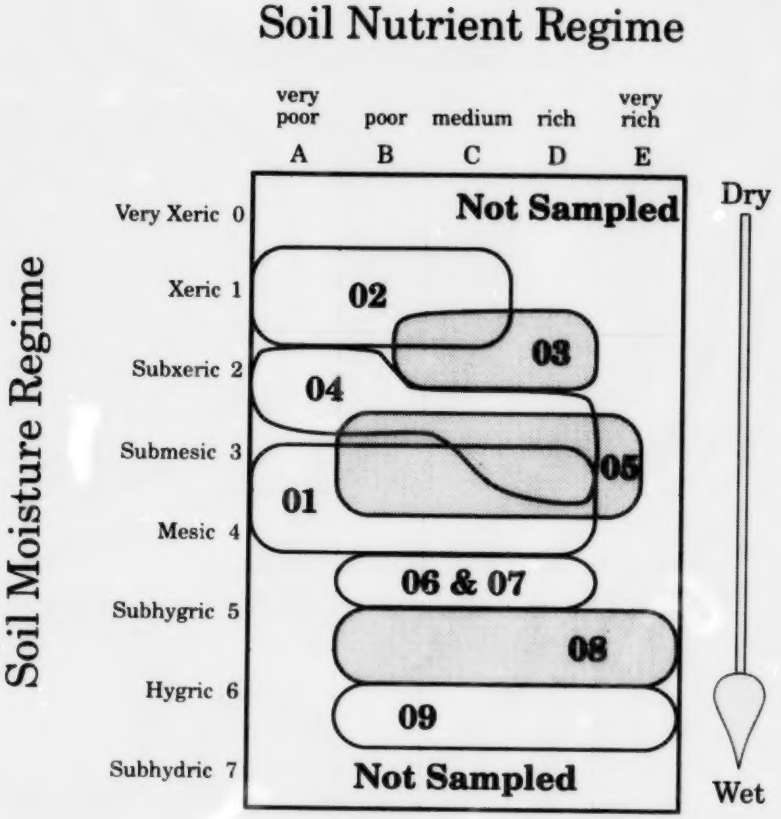
Zonal Sites: Mature climax stands of Fd and Py form open forests. The shrub layer is sparse, consisting mainly of birch-leaved spirea. Pinegrass dominates the understory and there is usually a low cover of lawn moss. The dominant soils are Gray Luvisols, and Dystric, Eutric and Melanic Brunisols.

Dry Sites: Mature climax stands are composed of Fd and Py. The stands are very open, with an equally sparse understory of shrubby penstemon, saskatoon, birch-leaved spirea and bluebunch wheatgrass. The moss layer is sparse.

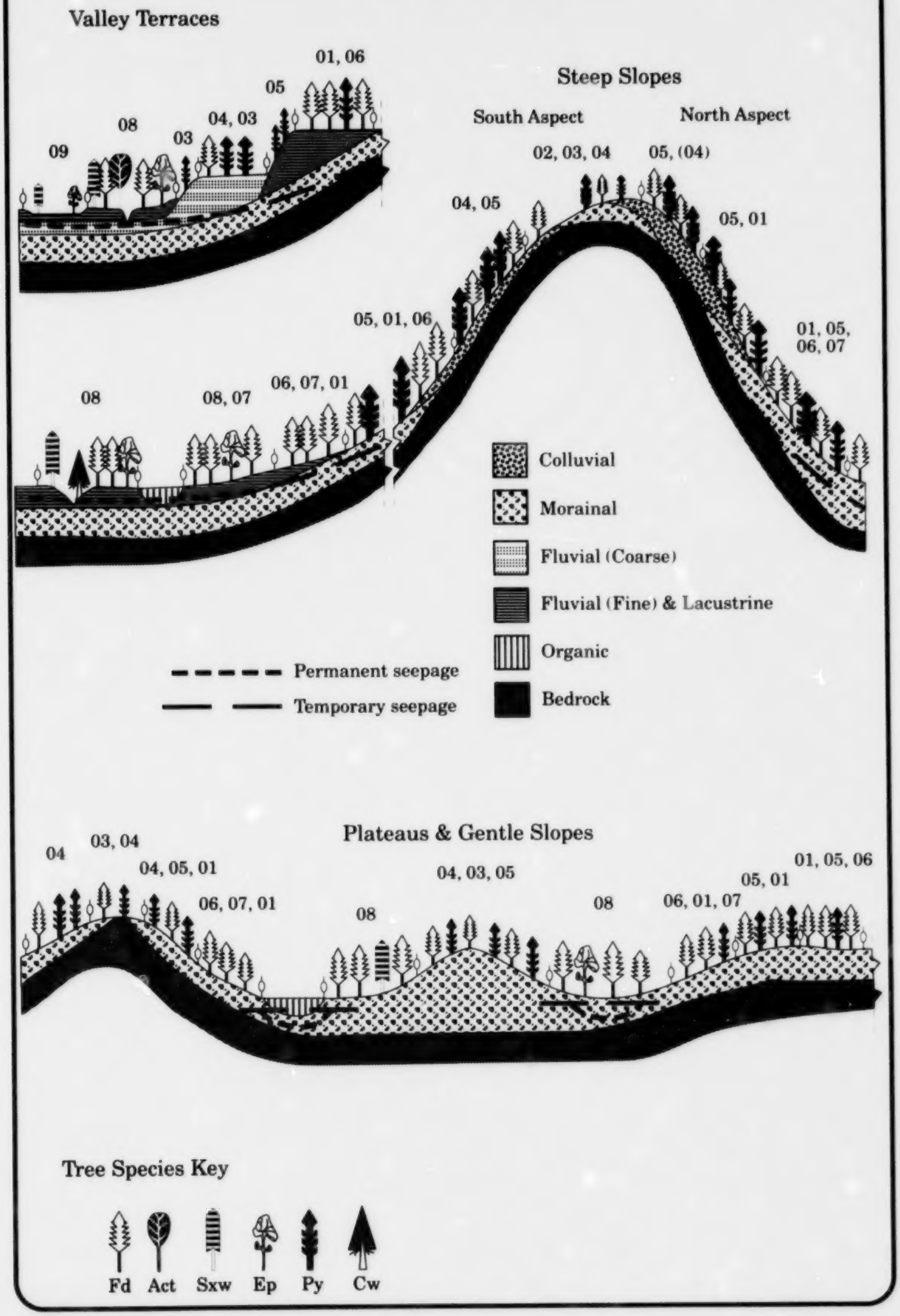
Wet Sites: Mature seral sites are characterized by Fd, with Ep as the seral species. The moderately shrubby understory consists of Douglas maple, common snowberry, red-osier dogwood and black gooseberry. On wetter sites, willows and a dense herb cover of sedges, buttercups, bluejoint and tufted clubrush are present. Lanky moss forms a patchy moss layer.

BGC Features: The IDF is distinguished from the other zones by the presence of climax stands of Fd and an understory of pinegrass. The IDFxh is separated from the other IDF subzones by the absence of Pl and Cw and the presence of Py. The greater abundance of Py, low moss cover, and presence of snowbrush on dry sites distinguishes the IDFxh1 from the IDFxh2.

Comments: Grassland communities occurring in the IDFxh1 are described as part of the IDFxh1a phase.



02	FdPy — Bluebunch wheatgrass — Balsamroot
03	FdPy — Bluebunch wheatgrass — Pinegrass
04	FdPy — Snowbrush — Pinegrass
05	FdPy — Pinegrass — Idaho fescue
Zonal 01	FdPy — Pinegrass
06	FdPy — Spirea — Feathermoss
07	FdPy — Snowberry — Spirea
08	SxwFd — Douglas maple — Dogwood
09	Willow — Sedge


Valley Terraces
09
08
03
04, 03
05
01, 06
Steep Slopes
South Aspect
North Aspect
02, 03, 04
05, (04)
04, 05
05, 01
05, 01, 06
01, 05,
06, 07
08
08, 07
06, 07, 01
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
04
03, 04
04, 05, 01
06, 07, 01
08
04, 03, 05
08
06, 01, 07
05, 01
01, 05, 06
Tree Species Key
Fd
Act
Sxw
Ep
Py
Cw

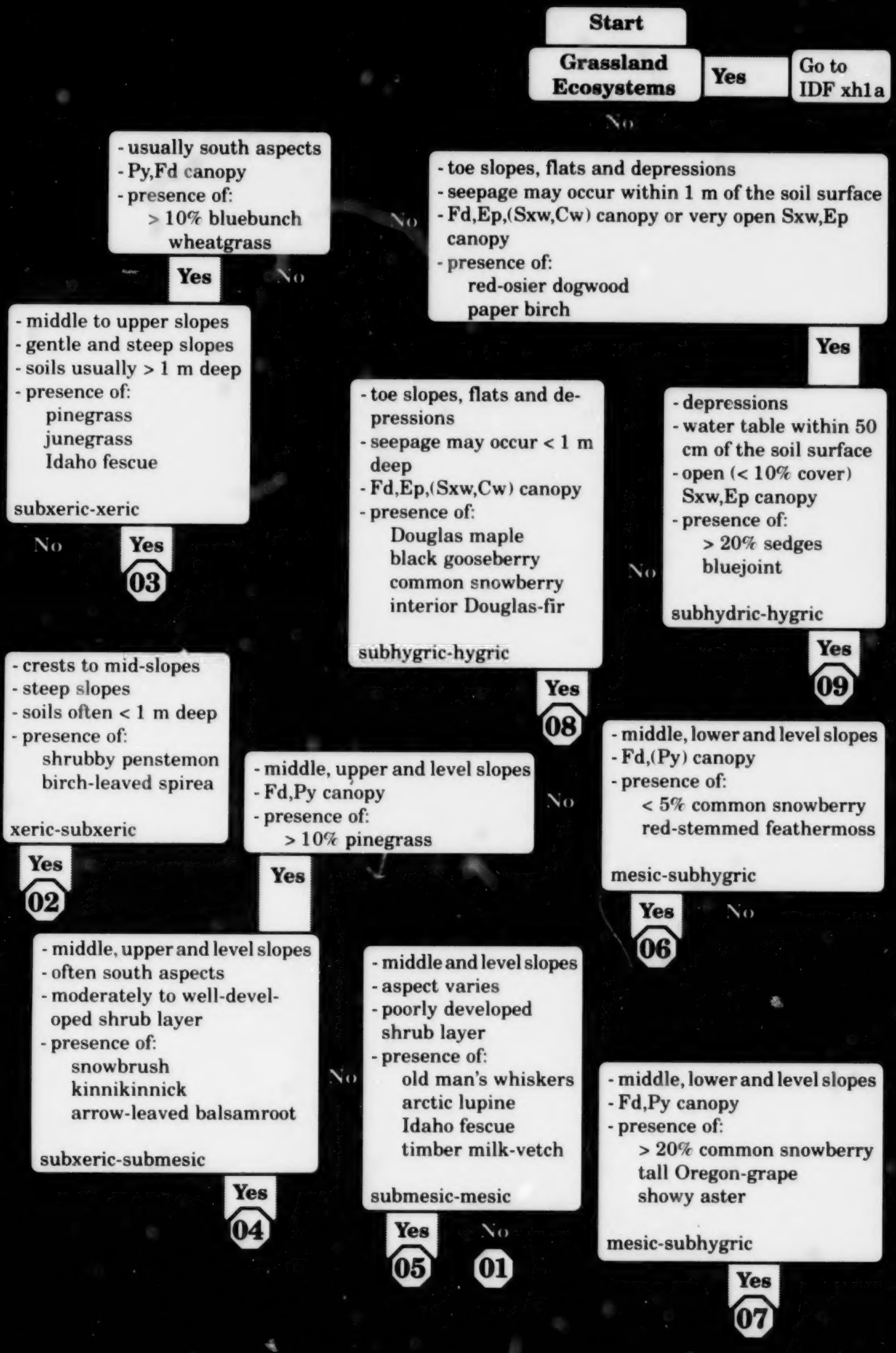
IDF xh1 Vegetation Table

	Site Units	02	03	04	05	01	06	07	08	09	
Trees	*Pinus ponderosa*	■	■	■	▬	■	▮	■			ponderosa pine
	Pseudotsuga menziesii var.*glauca*	■	■	■	■	▬	▬	▬	■		interior Douglas-fir
	Betula papyrifera								■	■	paper birch
Shrubs	*Penstemon fruticosus*	▮									shrubby penstemon
	Ceanothus velutinus			■							snowbrush
	Amelanchier alnifolia	▮	▮	▮			▮	▮			saskatoon
	Spiraea betulifolia	▮		■		■	■	■			birch-leaved spirea
	Mahonia aquifolium					▮	▮	▮	▮		tall Oregon-grape
	Symphoricarpos albus					▮	▮	▬	■		common snowberry
	Acer glabrum							▮	■		Douglas maple
	Ribes lacustre								▮		black gooseberry
	Cornus sericea								■	▮	red-osier dogwood
	Salix spp.									■	willows
Herbs	*Balsamorhiza sagittata*	▮	▮	▮							arrow-leaved balsamroot
	Achillea millefolium	▮	▮	▮							yarrow
	Agropyron spicatum	■	▬	▮	▮						bluebunch wheatgrass
	Selaginella densa		▮								compact selaginella
	Koeleria macrantha		▮								junegrass
	Arctostaphylos uva-ursi			▮							kinnikinnick
	Festuca idahoensis		▮		■						Idaho fescue
	Astragalus miser				▮						timber milk-vetch
	Poa pratensis				▮						Kentucky bluegrass
	Heuchera cylindrica				▮						round-leaved alumroot
	Geum triflorum				▮						old man's whiskers
	Lupinus arcticus				■						arctic lupine
	Calamagrostis rubescens		▮	▬	▬	▬	■	▮			pinegrass
	Equisetum arvense									▮	common horsetail
	Galium triflorum									▮	sweet-scented bedstraw
	Juncus arcticus									▮	arctic rush
	Trichophorum cespitosum									■	tufted clubrush
	Calamagrostis canadensis									■	bluejoint
	Ranunculus spp.									■	buttercups
	Carex spp.									▬	sedges
Mosses	*Brachythecium albicans*					▮	▮				lawn moss
	Pleurozium schreberi						■				red-stemmed feathermoss
	Mnium spp.								▮		leafy mosses
	Rhytidiadelphus loreus									■	lanky moss

IDF xh1 Environment Table

Site Units	02	03	04	05	01	06	07	08	09
					Zonal				
Soil Moisture Regime	X-SX	SX-X	SX-SM	SM-M	M-SM	M-SHG	M-SHG	SHG-HG	HG-SHD
Prevailing Successional Stage Sampled	Maturing Climax			Maturing Seral	Maturing Climax			Maturing Seral	
Aspect	South	All	South	All				N/A	
Slope Gradient & Mesoslope Position	Steep Mid.-upp. & crest	Steep - (gentle) Middle - upper	Gentle Middle - upper	Gentle - steep Middle	Gentle - steep Middle - lower	Gentle Middle - lower & toe		Gentle Low.-toe & depres.	Flat Depression
Soil Texture Class	Variable				Medium			Variable	
Parent Materials	Cv ,(Fb)	Mb,(Fb)	Mb	Mb, (Fb)		Mb	Mb,(Lb)	Fb	
Important Soil Features	L-15+	--------						W 10-100	W 10 - 50

IDF xh1



Start

Grassland Ecosystems — Yes — Go to IDF xh1a

No

- toe slopes, flats and depressions
- seepage may occur within 1 m of the soil surface
- Fd,Ep,(Sxw,Cw) canopy or very open Sxw,Ep canopy
- presence of:
  - red-osier dogwood
  - paper birch

Yes

- depressions
- water table within 50 cm of the soil surface
- open (< 10% cover) Sxw,Ep canopy
- presence of:
  - > 20% sedges
  - bluejoint

subhydric-hygric

Yes — 09

No

- toe slopes, flats and depressions
- seepage may occur < 1 m deep
- Fd,Ep,(Sxw,Cw) canopy
- presence of:
  - Douglas maple
  - black gooseberry
  - common snowberry
  - interior Douglas-fir

subhygric-hygric

Yes — 08

No

- usually south aspects
- Py,Fd canopy
- presence of:
  - > 10% bluebunch wheatgrass

Yes

- middle to upper slopes
- gentle and steep slopes
- soils usually > 1 m deep
- presence of:
  - pinegrass
  - junegrass
  - Idaho fescue

subxeric-xeric

Yes — 03

No

- crests to mid-slopes
- steep slopes
- soils often < 1 m deep
- presence of:
  - shrubby penstemon
  - birch-leaved spirea

xeric-subxeric

Yes — 02

No

- middle, upper and level slopes
- Fd,Py canopy
- presence of:
  - > 10% pinegrass

Yes

- middle, upper and level slopes
- often south aspects
- moderately to well-developed shrub layer
- presence of:
  - snowbrush
  - kinnikinnick
  - arrow-leaved balsamroot

subxeric-submesic

Yes — 04

No

- middleand level slopes
- aspect varies
- poorly developed shrub layer
- presence of:
  - old man's whiskers
  - arctic lupine
  - Idaho fescue
  - timber milk-vetch

submesic-mesic

Yes — 05

No — 01

No

- middle, lower and level slopes
- Fd,(Py) canopy
- presence of:
  - < 5% common snowberry
  - red-stemmed feathermoss

mesic-subhygric

Yes — 06

No

- middle, lower and level slopes
- Fd,Py canopy
- presence of:
  - > 20% common snowberry
  - tall Oregon-grape
  - showy aster

mesic-subhygric

Yes — 07

OKANAGAN VERY DRY HOT
INTERIOR DOUGLAS-FIR VARIANT, GRASSLAND PHASE

Distribution: The IDFxh1a occurs between Vernon and Lumby in the Coldstream Creek valley, and on the east side of Okanagan Lake from north of Kelowna to Woods Lake. It also occurs in the Princeton area. The IDFxh1a occurs above the PPxh1 and below the IDFxh1.

Vegetation and Soils

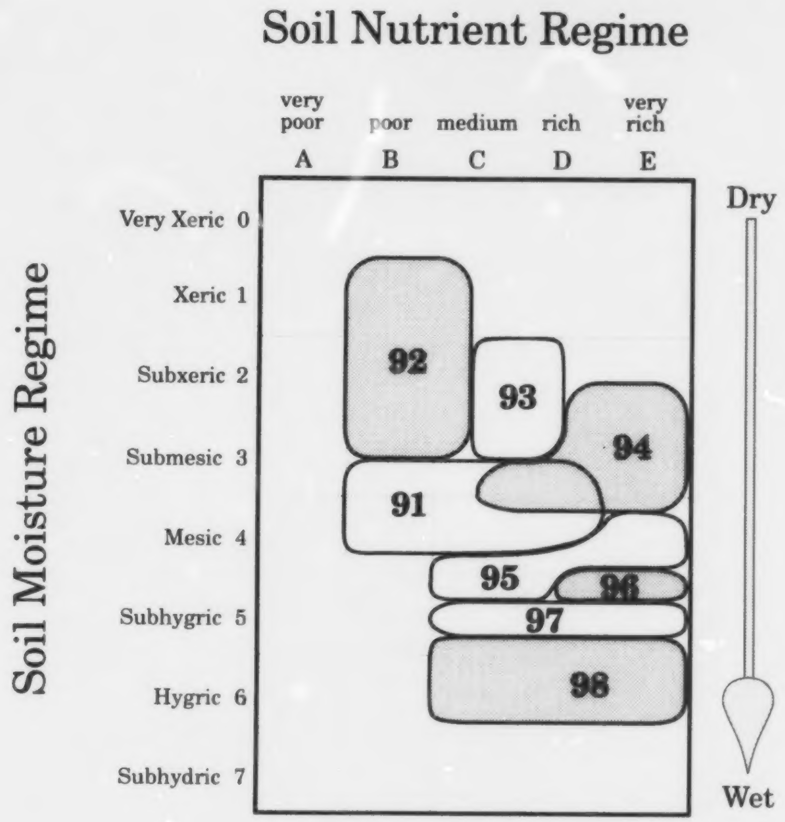
Mesic Sites: These sites are believed to represent disclimax or edaphic grassland ecosystems dominated by Idaho fescue and bluebunch wheatgrass, with lesser amounts of silky lupine, arrow-leaved balsamroot, parsnip-flowered buckwheat and junegrass. Lichens and mosses occur sporadically. The soils are generally Dark Brown or Black Chernozems.

Dry Sites: These grassland sites are characterized by the occurrence of pasture sage, bluebunch wheatgrass, arrow-leaved balsamroot and silky lupine. Increasers are Sandberg's bluegrass and cheatgrass. Mosses are poorly developed.

Wet Sites: Moist grassland sites are dominated by Idaho fescue, Kentucky bluegrass and stiff needlegrass. Prairie rose is the common shrub. A low cover of lichens is constant. On wetter sites, At and Py form moderately dense stands. The diverse understory is dominated by prairie rose.

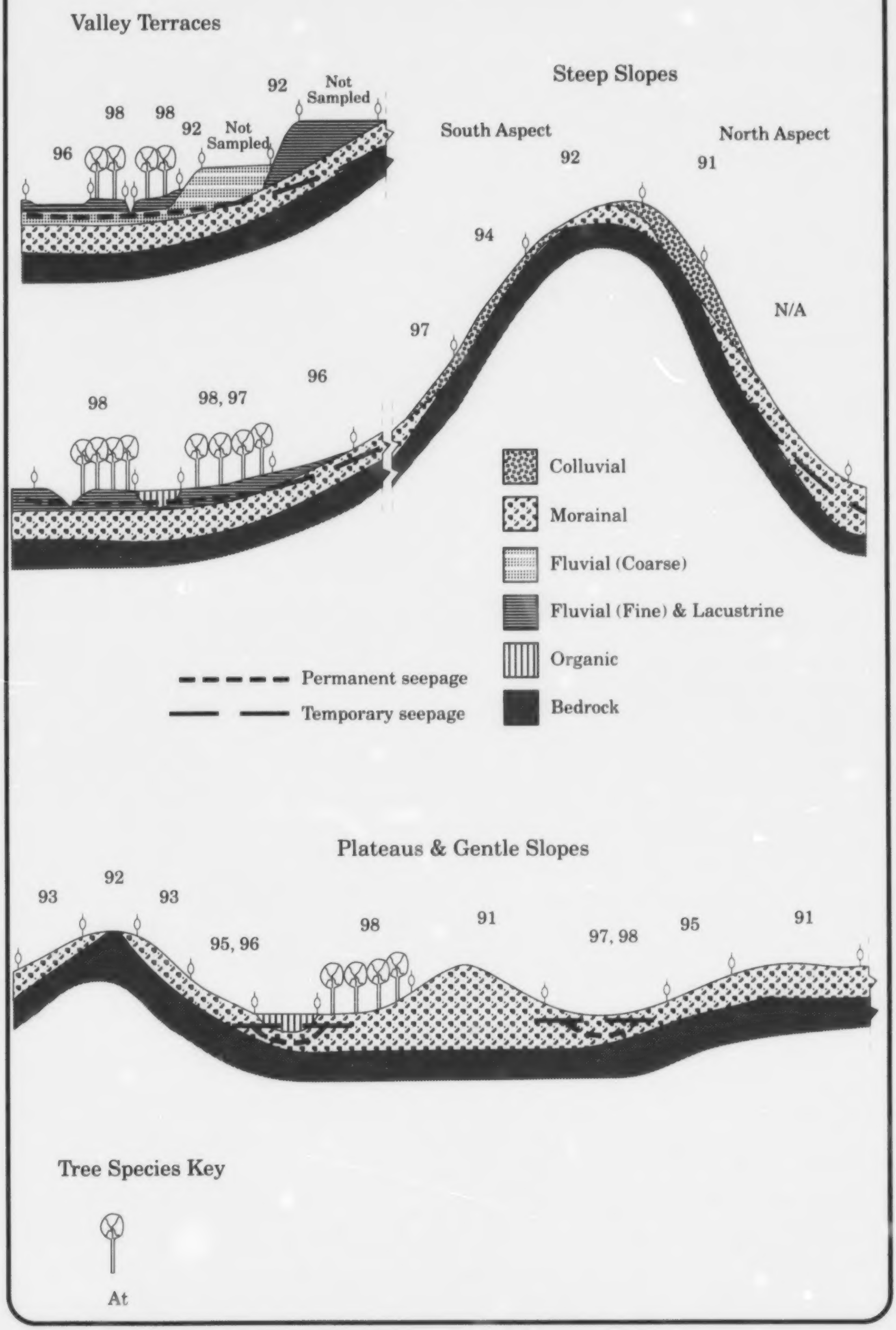
BGC Features: The IDFxh1a grassland phase is distinguished from the BG zone by the presence of fescue. The IDFxh1a has Idaho fescue; the more northerly IDFxh2a has rough fescue.

Comments: Forested ecosystems occurring within the phase are described as part of the IDFxh1.



92	Big sage — Bluebunch wheatgrass — Balsamroot
93	Bluebunch wheatgrass — Balsamroot
94	Big sage — Bluebunch wheatgrass — Idaho fescue
91	Idaho fescue — Bluebunch wheatgrass
95	Big sage — Kentucky bluegrass
96	Kentucky bluegrass — Stiff needlegrass
97	Prairie rose — Idaho fescue
98	At — Snowberry — Kentucky bluegrass

IDF xh1a


Valley Terraces
96
98
98
92
Not Sampled
92
Not Sampled
Steep Slopes
South Aspect
North Aspect
92
91
94
N/A
97
96
98
98, 97
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
93
92
93
95, 96
98
91
97, 98
95
91
Tree Species Key
At

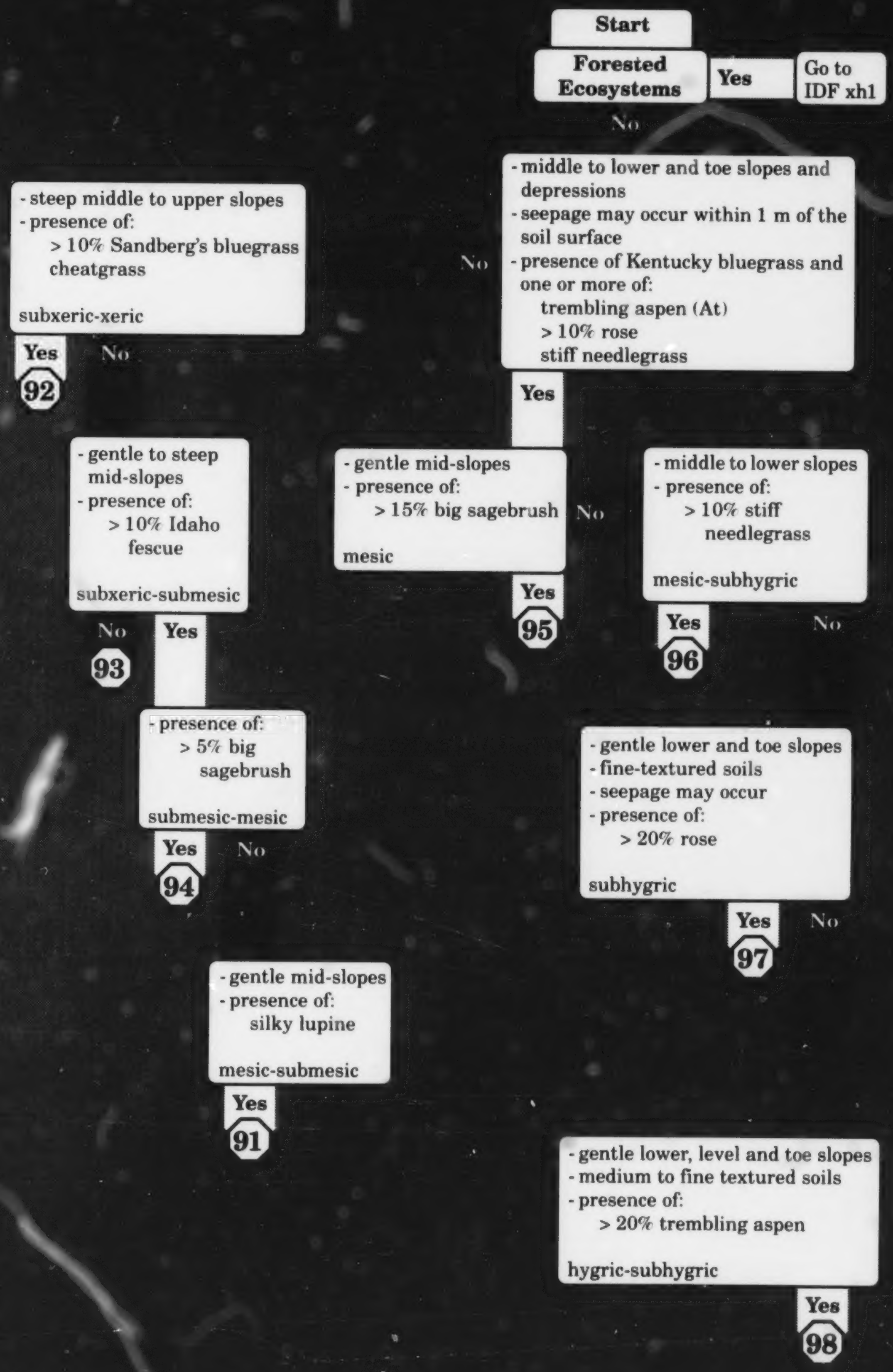
IDF xh1a Vegetation Table

	Site Units	92	93	94	91	95	96	97	98	
Trees	*Populus tremuloides*								■■■	trembling aspen
	Pinus ponderosa								▮	ponderosa pine
Shrubs	*Artemisia tridentata*	■		■■■		■■■				big sagebrush
	Symphoricarpos albus							▮	▮	common snowberry
	Artemisia frigida		▮							pasture sage
	Rosa woodsii							■■■		prairie rose
	Clematis occidentalis								▮	blue clematis
	Rosa spp.								▮	roses
	Ribes cereum								▮	squaw currant
	Salix spp.								▮	willows
	Mahonia aquifolium								▮	tall Oregon-grape
Herbs	*Bromus tectorum*	■								cheatgrass
	Poa sandbergii	■■	▮							Sandberg's bluegrass
	Balsamorhiza sagittata	■■	■■■	■■	▮					arrow-leaved balsamroot
	Agropyron spicatum	■■■	■■■	■■	■■			■■	▮	bluebunch wheatgrass
	Lupinus sericeus	▮	■■		■	■	▮			silky lupine
	Eriogonum heracleoides	▮		▮	▮	▮		■		parsnip-flowered buckwheat
	Achillea millefolium		▮	▮		■	▮		▮	yarrow
	Koeleria macrantha		▮	▮	▮				▮	junegrass
	Lithospermum ruderale			▮		▮				lemonweed
	Festuca idahoensis			■■	■■■			■■■		Idaho fescue
	Antennaria umbrinella				▮			▮		umber pussytoes
	Poa pratensis					■■■	■■■	■■■	■■	Kentucky bluegrass
	Stipa occidentalis					▮	■■	■		stiff needlegrass
	Erigeron corymbosus							▮		long-leaved fleabane
	Potentilla gracilis							▮		graceful cinquefoil
	Smilacina stellata						▮			star-flowered false Solomon's-seal
Mosses & Lichens	*Ceratodon purpureus*				▮					moss
	Peltigera rufescens				▮					lichen
	Cladonia spp.							▮		lichens

IDF xh1a Environment Table

Site Units	92	93	94	91	95	96	97	98
Soil Moisture Regime	SX-X	SX-SM	SM-M	M-SM	M	M-SHG	SHG	HG-SHG
Prevailing Successional Stage Sampled	Young Climax	Maturing Seral	Disclimax		Maturing Seral			
Aspect	South			All				
Slope Gradient & Mesoslope Position	Steep Middle - upper	Gentle - steep Middle - upper	Gentle - steep Middle	Gentle Middle	Gentle Middle - lower	Gentle Lower - toe	Level - gentle Lower - toe	
Soil Texture Class	Medium	Med-Crse	Medium	Fine	Medium - Fine			
Parent Materials	Mb	Mb,Cv	Mb,Mv	Mb,Cb,FGb	Mb	Mb,FGb	Mb,Cb	Mb,FGb
Important Soil Features	--------						Some W	

IDF xh1a


Start
Forested Ecosystems
Yes
Go to IDF xh1
No
- middle to lower and toe slopes and depressions
- seepage may occur within 1 m of the soil surface
- presence of Kentucky bluegrass and one or more of:
trembling aspen (At)
> 10% rose
stiff needlegrass
No
- steep middle to upper slopes
- presence of:
> 10% Sandberg's bluegrass
cheatgrass
subxeric-xeric
Yes
92
No
- gentle to steep mid-slopes
- presence of:
> 10% Idaho fescue
subxeric-submesic
No
93
Yes
- presence of:
> 5% big sagebrush
submesic-mesic
Yes
94
No
- gentle mid-slopes
- presence of:
silky lupine
mesic-submesic
Yes
91
Yes
- gentle mid-slopes
- presence of:
> 15% big sagebrush
mesic
Yes
95
No
- middle to lower slopes
- presence of:
> 10% stiff needlegrass
mesic-subhygric
Yes
96
No
- gentle lower and toe slopes
- fine-textured soils
- seepage may occur
- presence of:
> 20% rose
subhygric
Yes
97
No
- gentle lower, level and toe slopes
- medium to fine textured soils
- presence of:
> 20% trembling aspen
hygric-subhygric
Yes
98

IDF xh2

THOMPSON VERY DRY HOT
INTERIOR DOUGLAS-FIR VARIANT

Distribution: The IDFxh2 occurs in the valley bottoms and lower slopes of the North Thompson, South Thompson and Fraser rivers, and their associated tributaries downstream from Vavenby, Chase and Big Bar Creek, respectively. It is found on the lower slopes of the Nicoamen Plateau and the valley bottoms of Pavillion and Hat creeks. It generally occurs above either the PPxh2 or BGxw1 and below the IDFdk1.

Elevational Range (Mean): 850-1130 m

Climate: The IDF zone is characterized by a warm, dry climatic regime with a relatively long growing season in which moisture deficits are common. The IDFxh is the warmest and driest forested subzone in the IDF zone. The northern IDFxh2 variant is cooler and has a shorter growing season than the southern IDFxh1 variant.

Vegetation and Soils

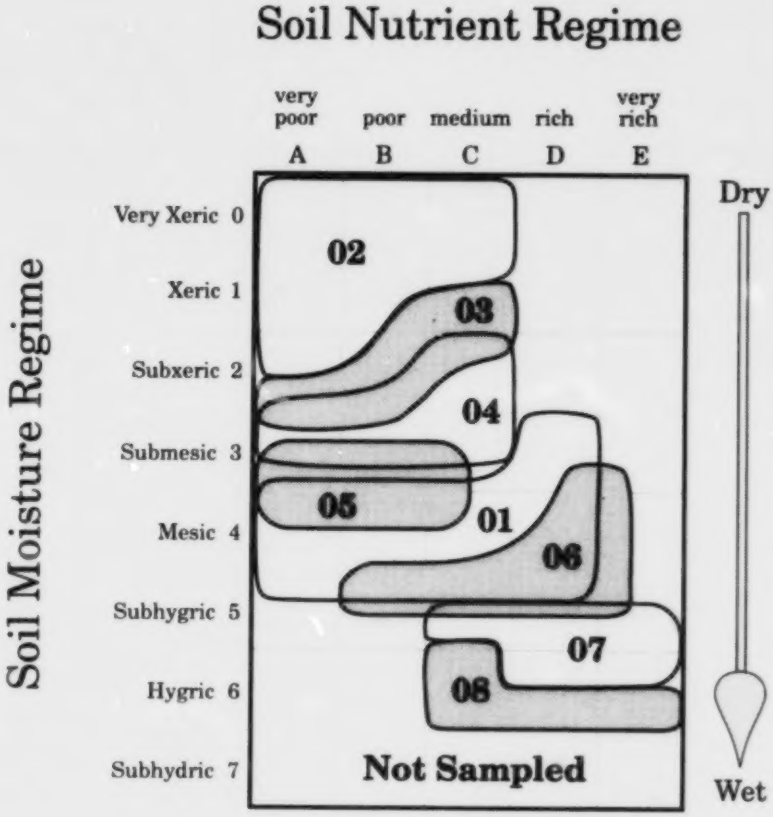
Zonal Sites: Fd forms climax stands; Py often occurs in seral stands. The open, pinegrass-dominated understory is species poor, but common snowberry, birch-leaved spirea, saskatoon, tall Oregon-grape, red-stemmed feathermoss and electrified cat's-tail moss are consistently present. Common soils include Eutric, Melanic and Dystric Brunisols, and Gray Luvisols.

Dry Sites: The dominant climax tree is Fd, although stands contain an equal amount of Py on steep, south-facing slopes. Bluebunch wheatgrass dominates the understory of these open stands. Shrubby penstemon, saskatoon and birch-leaved spirea commonly occur. The moss layer is poorly developed.

Wet Sites: Mature seral sites are dominated by Fd, Sxw, Cw and the seral tree species, Ep. On active floodplains, At and Act commonly occur. A moderate shrub cover is provided by common snowberry, Douglas maple and red-osier dogwood. The herb layer is variable, and a bryophyte layer is usually sparse. Wetter sites are dominated by common horsetail.

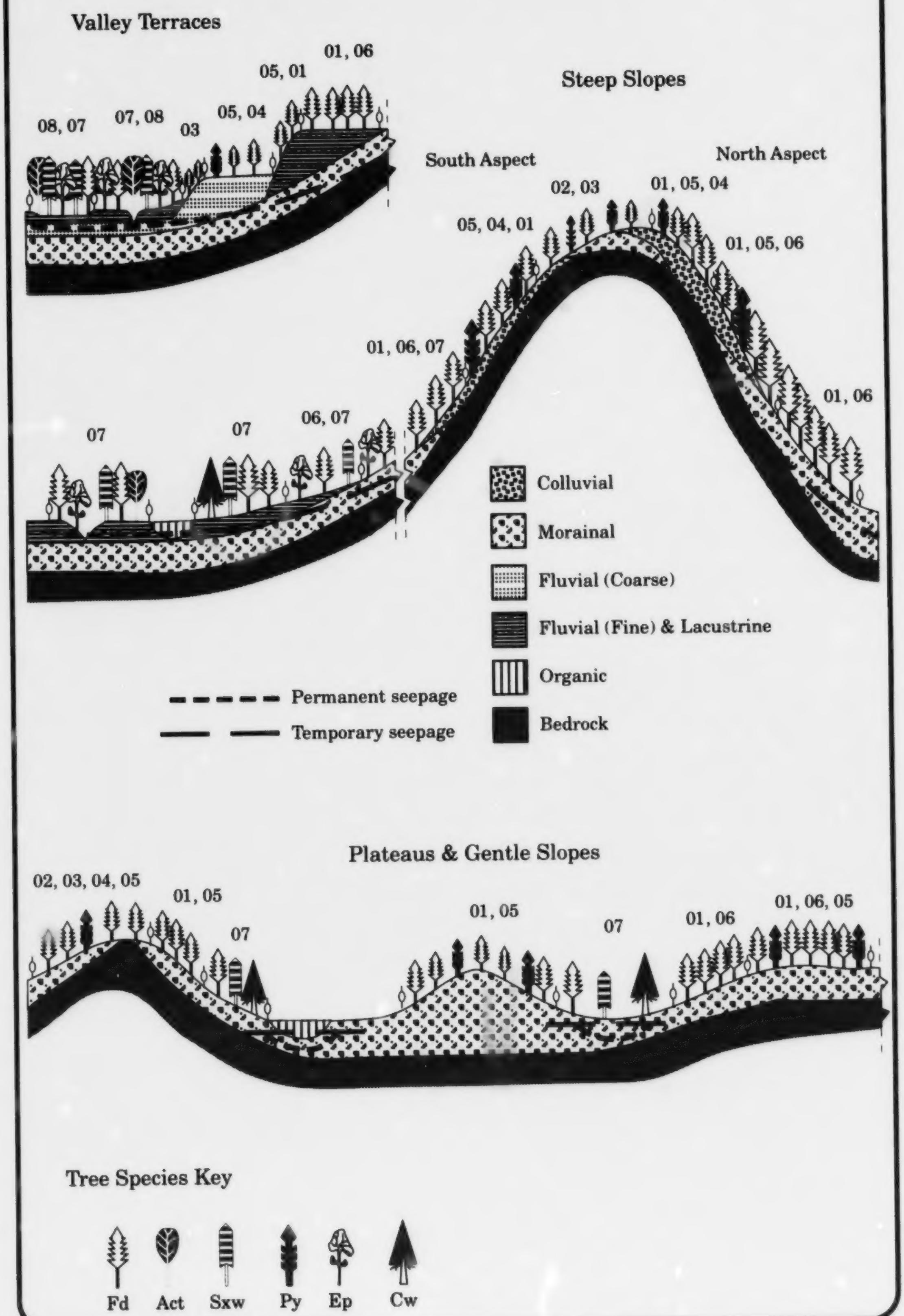
BGC Features: The IDF is distinguished from the other zones by the presence of climax stands of Fd and a herb layer dominated by pinegrass. The lack of Pl, soopolallie and kinnikinnick on zonal sites separates the IDFxh2 from the IDFdk1. The IDFxh2 is distinguished from the IDFxh1 by a lower frequency and cover of Py and the presence of a well-developed moss layer. Drier IDFxh2 sites also lack snowbrush.

Comments: Grassland ecosystems occurring on ridge crests or southern exposures are described with the IDFxh2a phase.



02	FdPy — Bluebunch wheatgrass — Rough fescue
03	FdPy — Bluebunch wheatgrass — Balsamroot
04	FdPy — Bluebunch wheatgrass — Pinegrass
05	FdPy — Pinegrass
Zonal 01	FdPy — Pinegrass — Feathermoss
06	Fd — Feathermoss
07	CwFd — Dogwood
08	Sxw — Horsetail

IDF xh2


Valley Terraces
08, 07
07, 08
03
05, 04
05, 01
01, 06
Steep Slopes
South Aspect
North Aspect
05, 04, 01
02, 03
01, 05, 04
01, 05, 06
01, 06, 07
01, 06
07
07
06, 07
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
02, 03, 04, 05
01, 05
07
01, 05
07
01, 06
01, 06, 05
Tree Species Key
Fd
Act
Sxw
Py
Ep
Cw

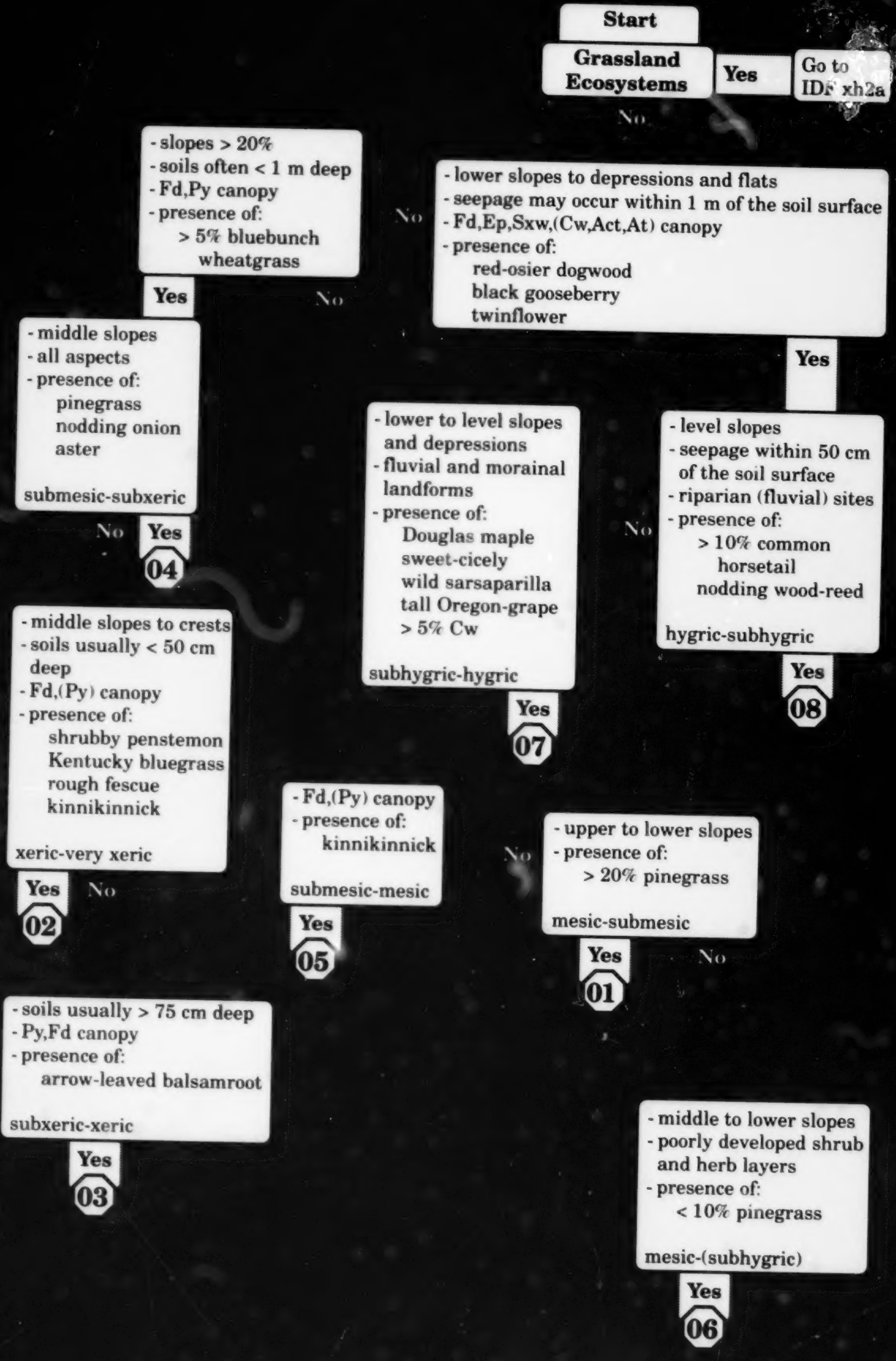
IDF xh2 Vegetation Table

	Site Units	02	03	04	05	01	06	07	08	
Trees	*Pseudotsuga menziesii var.glauca*	■■	■■	■■■	■■■	■■■	■■■	■■■	■■■	interior Douglas-fir
	Pinus ponderosa	▮	■■	■	■					ponderosa pine
	Thuja plicata							■■		western redcedar
	Betula papyrifera							■■■	▮	paper birch
	Picea engelmannii x glauca							■	■■■	hybrid white spruce
	Populus tremuloides								▮	trembling aspen
	Populus balsamifera								■	black cottonwood
Shrubs	*Penstemon fruticosus*	▮								shrubby penstemon
	Amelanchier alnifolia	▮	■	▮	▮	▮				saskatoon
	Spiraea betulifolia	▮	▮	▮	■	■	▮			birch-leaved spirea
	Shepherdia canadensis				▮					soopolallie
	Symphoricarpos albus					■	▮	■	■	common snowberry
	Mahonia aquifolium					▮		▮		tall Oregon-grape
	Acer glabrum							■■		Douglas maple
	Ribes lacustre							▮	▮	black gooseberry
	Cornus sericea							■	■■	red-osier dogwood
Herbs	*Agropyron spicatum*	■■■	■■■	■■■						bluebunch wheatgrass
	Festuca scabrella	■		■						rough fescue
	Poa pratensis	▮		▮					▮	Kentucky bluegrass
	Arctostaphylos uva-ursi	▮			■					kinnikinnick
	Balsamorhiza sagittata		■							arrow-leaved balsamroot
	Achillea millefolium			▮						yarrow
	Allium cernuum			▮						nodding onion
	Aster spp.			▮		■		▮		asters
	Calamagrostis rubescens			■■	■■■	■■■	▮			pinegrass
	Aralia nudicaulis							▮		wild sarsaparilla
	Osmorhiza chilensis							▮		sweet-cicely
	Linnaea borealis							▮	■	twinflower
	Pyrola asarifolia								▮	pink wintergreen
	Cinna latifolia								▮	nodding wood-reed
	Orthilia secunda								■	one-sided wintergreen
	Equisetum arvense								■■■	common horsetail
Mosses & Lichens	*Peltigera* spp.			▮	■	▮	▮			lichen
	Pleurozium schreberi				▮	■■	■■■			red-stemmed feathermoss
	Dicranum spp.				▮	▮	▮			moss
	Rhytidiadelphus triquetrus					▮	■			electrified cat's-tail moss
	Hylocomium splendens					▮	▮			step moss
	Ptilium crista-castrensis						▮			knight's plume

IDF xh2 Environment Table

Site Units	02	03	04	05	01 Zonal	06	07	08
Soil Moisture Regime	X-VX	SX-X	SM-SX	SM-M	M-SM	M-SHG	SHG-HG	HG-SHG
Prevailing Successional Stage Sampled	Maturing Climax	Maturing Seral			Maturing Climax		Maturing Seral	
Aspect	South		All				N/A	
Slope Gradient & Mesoslope Position	Steep Upper & crest	Steep Middle - upper	Steep Middle - lower	Gentle - steep Middle	Gentle - steep Middle - lower & level		Gentle Low.,toe & depres.	Flat Depression
Soil Texture Class	Variable	Coarse	Variable	Medium	Variable			Coarse
Parent Materials	Cv,Mv	Cb,Mb,Fb	Cb,Mb,Cv	Mb	Mb,(Fb)		Fb	
Important Soil Features	L 5-75	----	Some L	--------			Some W	W 10-50

IDF xh2



- lower slopes to depressions and flats
- seepage may occur within 1 m of the soil surface
- Fd,Ep,Sxw,(Cw,Act,At) canopy
- presence of:
  - red-osier dogwood
  - black gooseberry
  - twinflower

- level slopes
- seepage within 50 cm of the soil surface
- riparian (fluvial) sites
- presence of:
  - > 10% common horsetail
  - nodding wood-reed

hygric-subhygric

- slopes > 20%
- soils often < 1 m deep
- Fd,Py canopy
- presence of:
  - > 5% bluebunch wheatgrass

- middle slopes
- all aspects
- presence of:
  - pinegrass
  - nodding onion
  - aster

submesic-subxeric

- lower to level slopes and depressions
- fluvial and morainal landforms
- presence of:
  - Douglas maple
  - sweet-cicely
  - wild sarsaparilla
  - tall Oregon-grape
  - > 5% Cw

subhygric-hygric

- middle slopes to crests
- soils usually < 50 cm deep
- Fd,(Py) canopy
- presence of:
  - shrubby penstemon
  - Kentucky bluegrass
  - rough fescue
  - kinnikinnick

xeric-very xeric

- Fd,(Py) canopy
- presence of:
  - kinnikinnick

submesic-mesic

- upper to lower slopes
- presence of:
  - > 20% pinegrass

mesic-submesic

- soils usually > 75 cm deep
- Py,Fd canopy
- presence of:
  - arrow-leaved balsamroot

subxeric-xeric

- middle to lower slopes
- poorly developed shrub and herb layers
- presence of:
  - < 10% pinegrass

mesic-(subhygric)

IDF xh2a

THOMPSON VERY DRY HOT
INTERIOR DOUGLAS-FIR VARIANT, GRASSLAND PHASE

Distribution: The IDFxh2a is concentrated on the Douglas Plateau, between Nicola and Chapperon lakes, and along Quilchena Creek to Corbet Lake. At lower elevations, small patches occur above the BGxw1 south and north of Kamloops, and at the south end of Hat Creek. It occurs above the BGxw1 and below the IDFxh2.

Vegetation and Soils

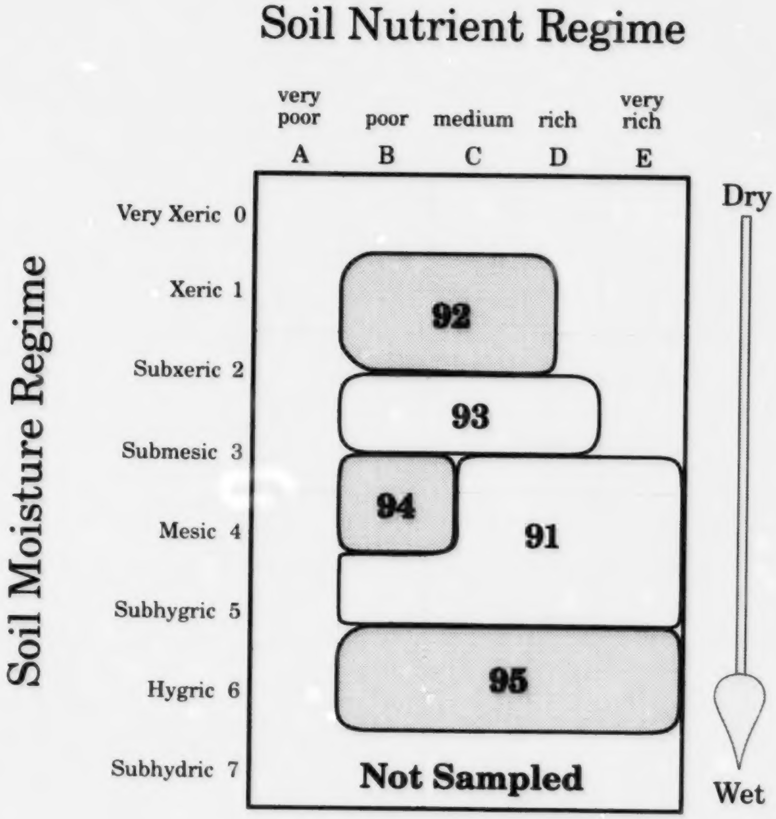
Mesic Sites: These sites are primarily edaphic or disclimax grasslands with a scattered occurrence of the shrub pasture sage. They have a lush cover of rough fescue and bluebunch wheatgrass and lesser amounts of junegrass, yarrow and timber milk-vetch. The moss layer is generally poorly developed.

Dry Sites: These are grasslands with a sporadic occurrence of pasture sage. Bluebunch wheatgrass is the dominant grass when range is in good condition. A common invader is needle-and-thread grass. Lichens occasionally occur.

Wet Sites: These sites are characterized by open to dense stands of At. The moderately open understory consists of Nootka rose, common snowberry, blue wildrye, Kentucky bluegrass and asters. The moss layer is poorly developed.

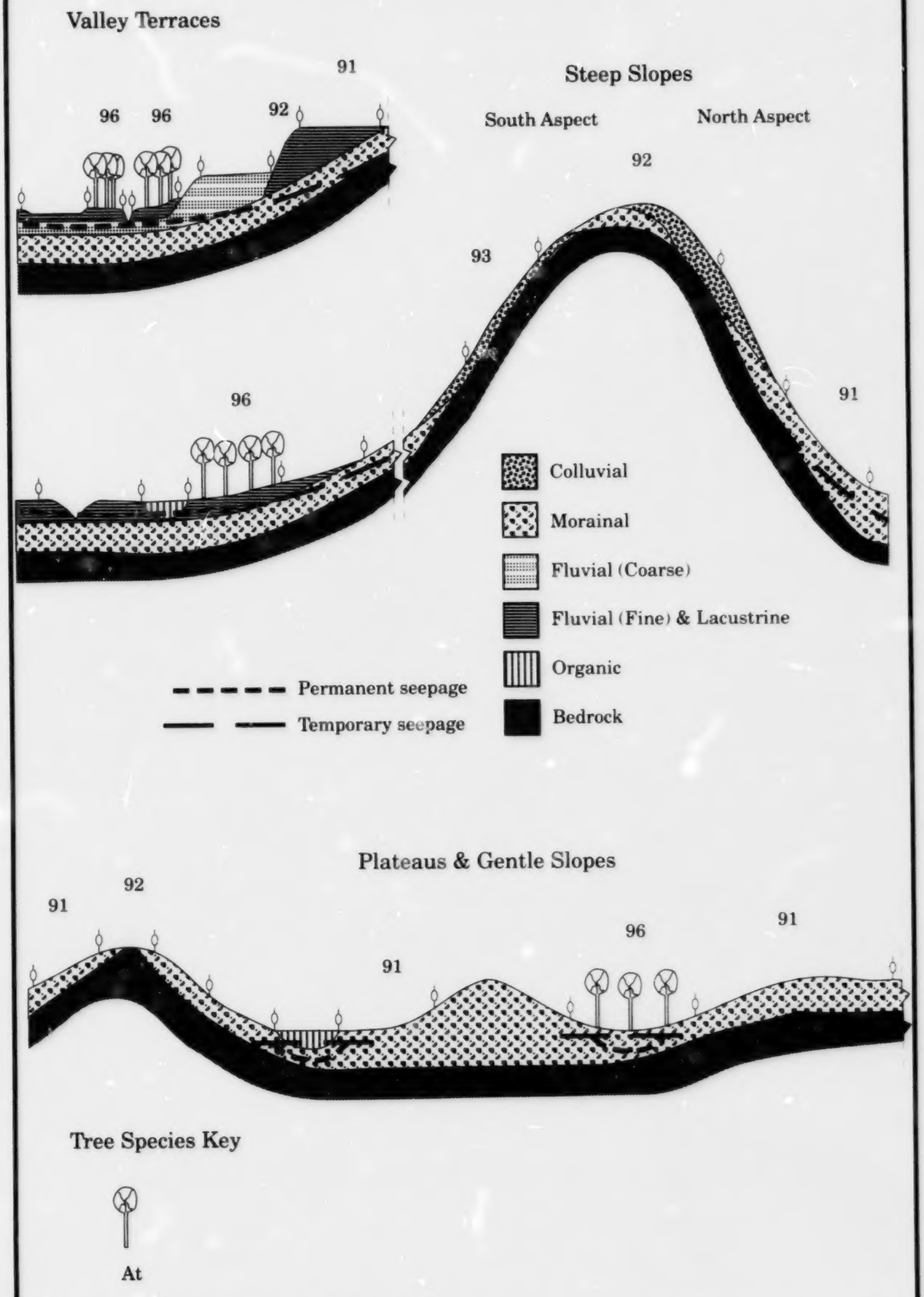
BGC Features: The IDFxh2a is distinguished from the BG grasslands by the lack of big sagebrush on zonal sites and the presence of rough fescue.

Comments: These plant communities also occur on dry sites of the forest dominated IDFxh2. Any forest sites found within this phase are described with the IDFxh2 site units. Many sites have been over-grazed and are in poor condition. These grasslands represent the "upper grasslands" (Nicholson *et al.* 1982).



92	Bluebunch wheatgrass — Needle-and-thread grass
93	Big sage — Kentucky bluegrass
94	Balsamroot — Kentucky bluegrass
91	Fescue — Bluebunch wheatgrass
95	At — Snowberry — Kentucky bluegrass

IDF xh2a



Note: Sampling in this phase is incomplete.

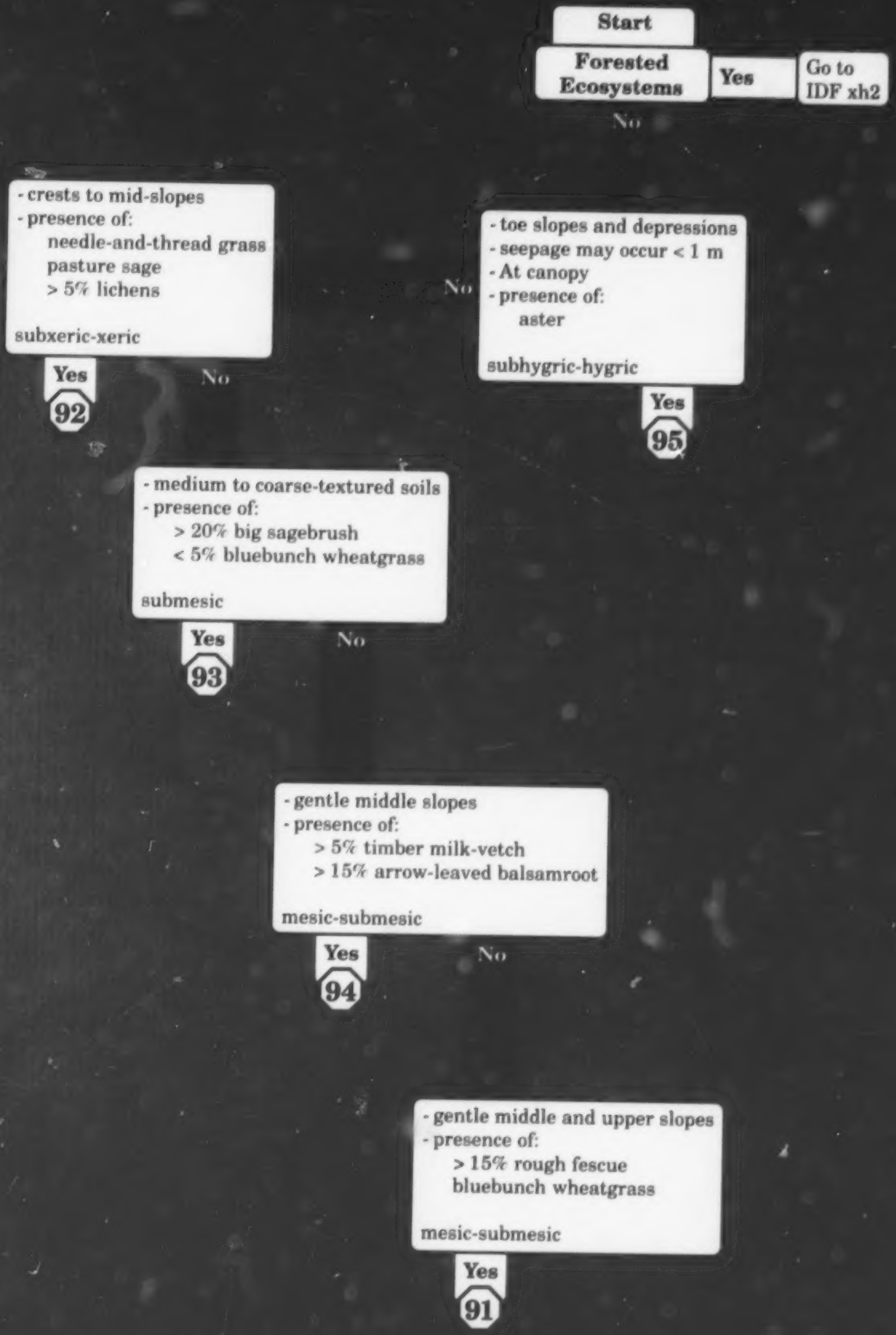
IDF xh2a Vegetation Table

	Site Units	92	93	94	91	96	
Trees	*Populus tremuloides*					▬	trembling aspen
Shrubs	*Artemisia frigida*	■			▮		pasture sage
	Artemisia tridentata		▬				big sagebrush
	Symphoricarpos albus			▮		■	common snowberry
	Rosa nutkana					■	Nootka rose
Herbs	*Stipa comata*	■					needle-and-thread grass
	Antennaria dimorpha	▮					low pussytoes
	Antennaria umbrinella	▮					umber pussytoes
	Stipa occidentalis	▮	▮				stiff needlegrass
	Oxytropis campestris		▮				field locoweed
	Lithospermum ruderale			▮			lemonweed
	Festuca scabrella	▮		▮	▬		rough fescue
	Agropyron spicatum	▬		▮	▬		bluebunch wheatgrass
	Koeleria macrantha	▮	▮	■	▮		junegrass
	Poa pratensis	■	▬	▬	■	■	Kentucky bluegrass
	Achillea millefolium		▮	■	▮		yarrow
	Astragalus miser		▮	■	▮		timber milk-vetch
	Balsamorhiza sagittata			▬			arrow-leaved balsamroot
	Lupinus sericeus				■		silky lupine
	Vicia americana					▮	American vetch
	Viola canadensis					▮	Canada violet
	Aster spp.					▮	asters
	Elymus glaucus					■	blue wildrye
Lichens	*Cladonia* spp.	■	▮		▮		lichens

IDF xh2a Environment Table

Site Units	92	93	94	91	96
Soil Moisture Regime	SX-X	SM	M-SM	SM-SHG	SHG-HG
Prevailing Successional Stage Sampled	Maturing Seral	Seral	Young Seral	Disclimax	Young Climax
Aspect	All	South	All		N/A
Slope Gradient & Mesoslope Position	Gentle - steep Crest - middle	Gentle Middle		Gentle Middle & upper	Gentle Toe - depression
Soil Texture Class	Variable	Med.-Crse.	Medium - Fine		Medium
Parent Materials	Mb,Cv/R	Mb	Mb,Cv/Mb	Mb	Mb,Fb
Important Soil Features	Some L	----------			Some W

IDF xh2a


Start
Forested Ecosystems
Yes
Go to IDF xh2
No
- crests to mid-slopes
- presence of:
needle-and-thread grass
pasture sage
> 5% lichens
subxeric-xeric
Yes
92
No
- toe slopes and depressions
- seepage may occur < 1 m
- At canopy
- presence of:
aster
subhygric-hygric
No
Yes
95
- medium to coarse-textured soils
- presence of:
> 20% big sagebrush
< 5% bluebunch wheatgrass
submesic
Yes
93
No
- gentle middle slopes
- presence of:
> 5% timber milk-vetch
> 15% arrow-leaved balsamroot
mesic-submesic
Yes
94
No
- gentle middle and upper slopes
- presence of:
> 15% rough fescue
bluebunch wheatgrass
mesic-submesic
Yes
91

DRY COLD
MONTANE SPRUCE SUBZONE

Distribution: The MSdc is located west of the Fraser River in the Bridge River drainage and its tributaries: Tyaughton, Gun, and Cadwallader creeks; and Yalakom and Hurley rivers. A thin band is found at mid-elevations along Cayoosh Creek to Duffey Lake. The MSdc occurs mainly above the IDFdk2 and below the ESSFdv.

Elevational Range (Mean): 1280-1500 m

Climate: The MS zone has cold winters and moderately short, warm summers. The MSdc has the highest precipitation, the lowest seasonal temperatures, and the fewest growing degree days of the MS subzones in the KFR.

Vegetation and Soils

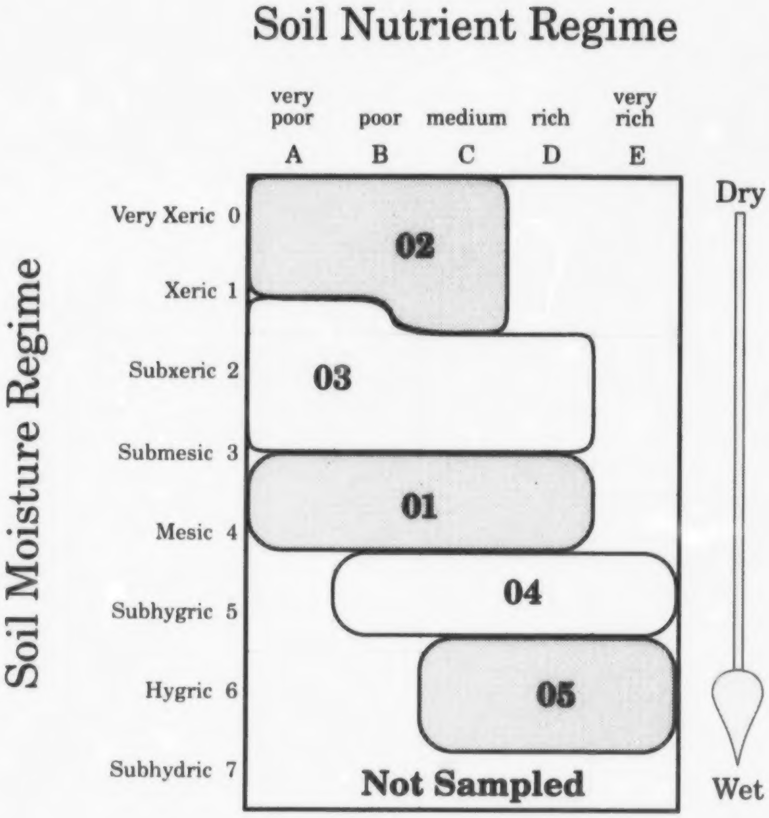
Zonal Sites: Mature seral stands have a mixed canopy dominated by Pl, and lesser amounts of the climax species Bl and Sxw. The understory is very sparse, with scattered shrubs and minor herbs. The moss layer is poorly developed. Common soils are Dystric and Eutric Brunisols.

Dry Sites: The mature seral species Pl and the climax species Fd form open stands. Common juniper, bluebunch wheatgrass and kinnikinnick are common in an open understory. The moss layer is sparse.

Wet Sites: On cool north aspects and in depressions, dense climax stands are composed of Bl, Sxw and minor Pl. The shrub and herb layers are sparse, but include black gooseberry, sweet-cicely, common horsetail and palmate coltsfoot. The moss layer is poorly developed. On wetter sites, sedges and glow moss dominate.

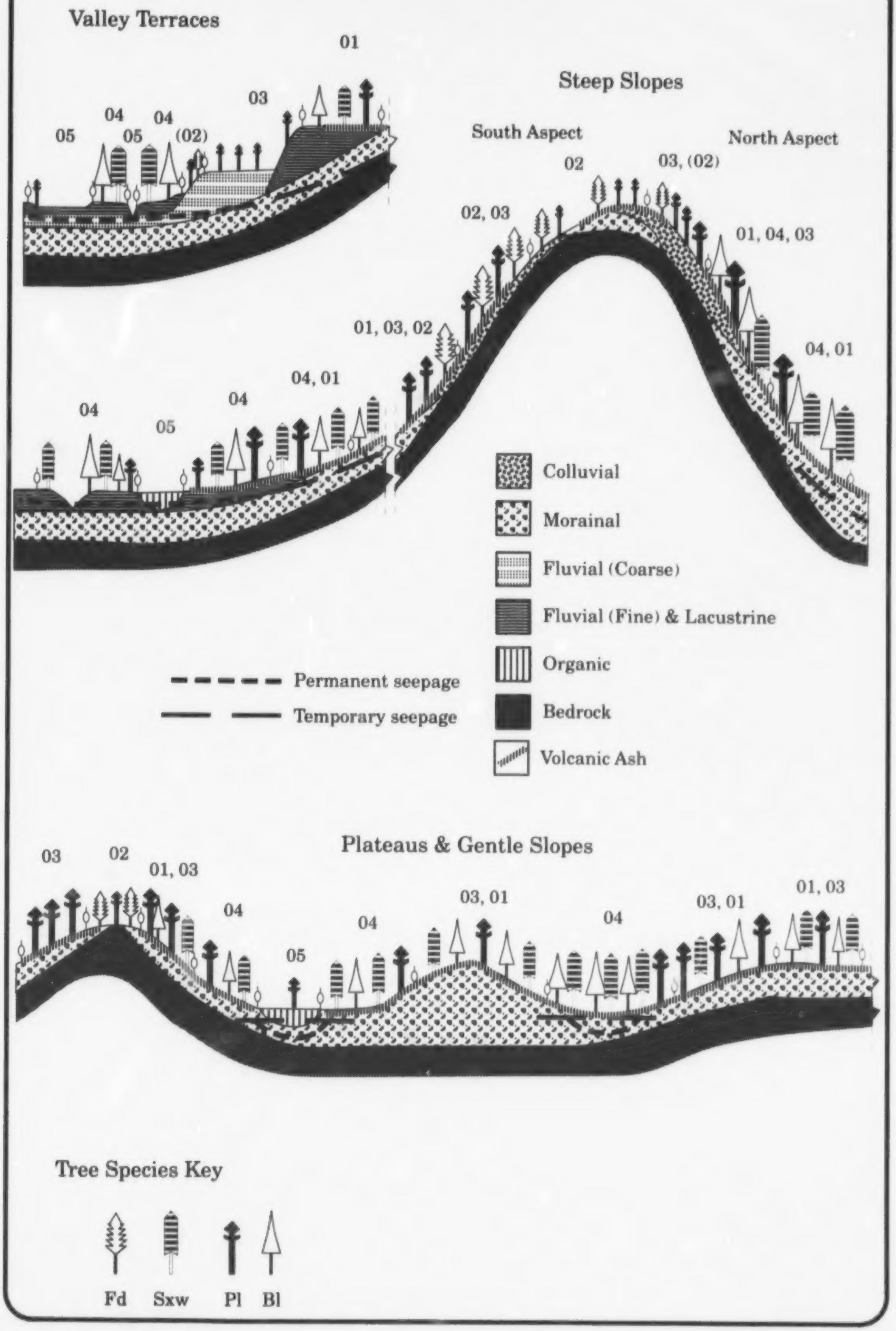
BGC Features: The MS is distinguished from the IDF by the presence of Bl and Sxw, and from the ESSF by the lack of white-flowered rhododendron and Sitka valerian. The absence of grouseberry and Utah honeysuckle differentiates the MSdc from other MS subzones and variants.

Comments: The MSdc variant has been poorly sampled. Additional site units probably occur.



02	FdPl — Juniper
03	Pl — Spirea — Pinegrass
Zonal 01	Sxw — Wintergreen — Feathermoss
04	Sxw — Gooseberry
05	Sedge — Glow moss

MS dc


Valley Terraces
01
03
04
04
05
05
(02)
05
Steep Slopes
South Aspect
North Aspect
02
03, (02)
02, 03
01, 04, 03
01, 03, 02
04, 01
04, 01
04
04
05
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Volcanic Ash
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03
02
01, 03
04
05
04
03, 01
04
03, 01
01, 03
Tree Species Key
Fd
Sxw
Pl
Bl

MS dc Vegetation Table*

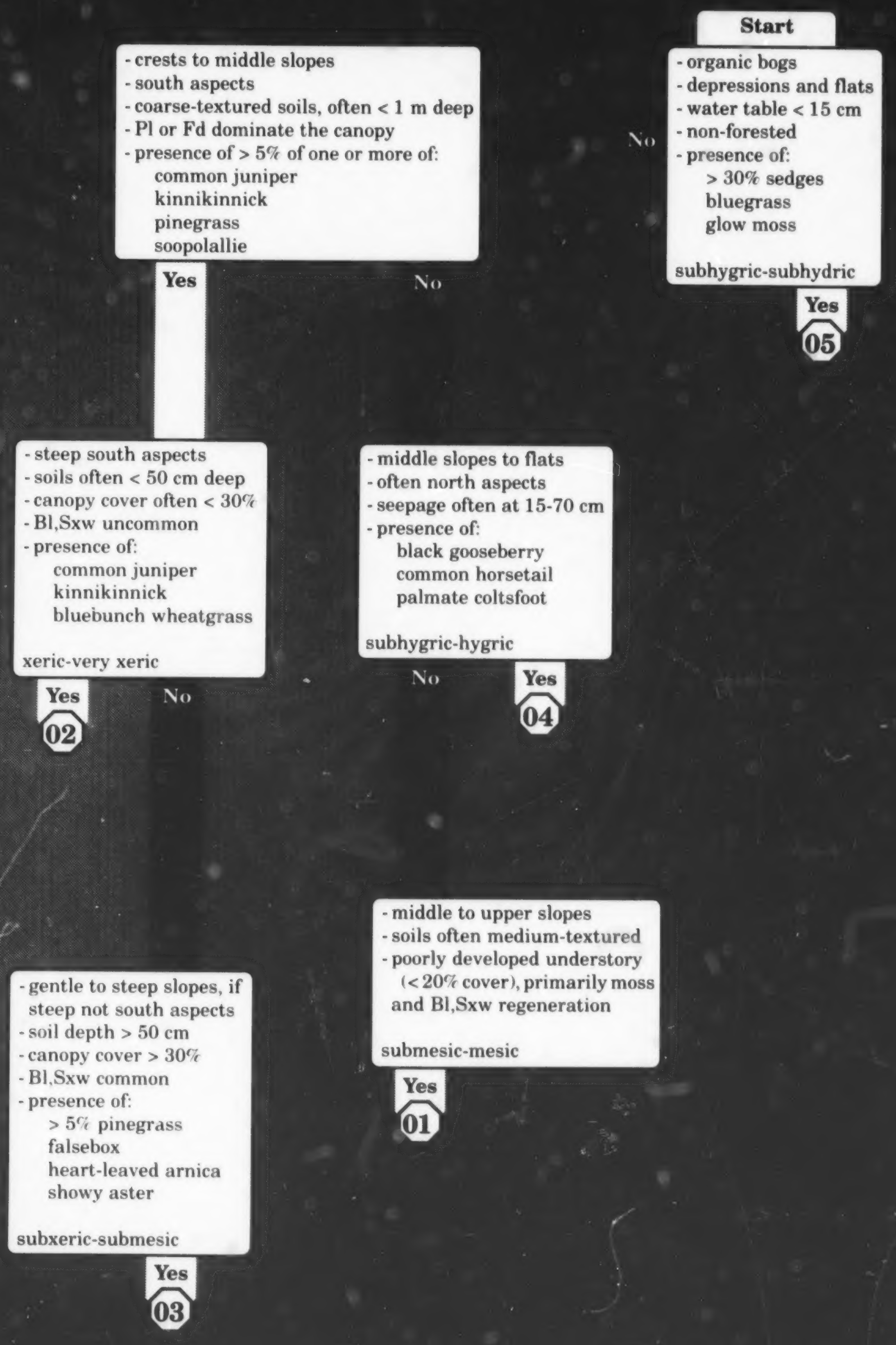
	Site Units	02	03	01	04	05	
Trees	*Pseudotsuga menziesii* var.*glauca*	▬	▮	▮			interior Douglas-fir
	Pinus contorta	■	▬▬	▬	■	▮	lodgepole pine
	Abies lasiocarpa		■	▬	▬		subalpine fir
	Picea engelmannii x glauca		▮	▬	▬▬		hybrid white spruce
Shrubs	*Juniperus communis*	■					common juniper
	Spiraea betulifolia		▬				birch-leaved spirea
	Shepherdia canadensis		■				soopolallie
	Paxistima myrsinites		▮	▮			falsebox
	Vaccinium membranaceum			▮	▮		black huckleberry
	Ribes lacustre				■		black gooseberry
	Spiraea pyramidata				▮		pyramid spirea
Herbs	*Agropyron spicatum*	▮					bluebunch wheatgrass
	Arctostaphylos uva-ursi	▮	■				kinnikinnick
	Calamagrostis rubescens	▮	▬				pinegrass
	Lupinus arcticus		■				arctic lupine
	Arnica cordifolia		▮				heart-leaved arnica
	Aster conspicuus		▮		▮		showy aster
	Orthilia secunda		▮	▮			one-sided wintergreen
	Osmorhiza chilensis				▮		sweet-cicely
	Petasites palmatus				▮		palmate coltsfoot
	Equisetum arvense				▮		common horsetail
	Juncus spp.				▮	▮	rushes
	Carex spp.					■	sedges
Mosses	*Pleurozium schreberi*			▬▬			red-stemmed feathermoss
	Dicranum fuscescens		■	■			curly heron's-bill moss
	Brachythecium spp.			▮	▮		mosses
	Timmia austriaca				▮		moss
	Aulacomnium palustre					▮	glow moss

* sampling is incomplete for this subzone.

MS dc Environment Table

Site Units	02	03	01	04	05
			Zonal		
Soil Moisture Regime	X-VX	SX-SM	SM-M	SHG-M	SHG-SHD
Prevailing Successional Stage Sampled	Maturing Seral				Young Climax
Aspect	South		All	North	N/A
Slope Gradient & Mesoslope Position	Steep Upp.-mid. & crest	Steep - gentle Upper & middle	Steep Middle	Steep - gentle Lower - middle	Flat Depression & level
Soil Texture Class	Coarse		Medium	Variable	
Parent Materials	Cv,Mv	Vv/Cv	Vv/Mb	Vv/Mb, Fv/Mb	Ob,Ov/M
Important Soil Features	L<25 or Very Coarse		----	W 15-70	W<15

MS dc



Start

- organic bogs
- depressions and flats
- water table < 15 cm
- non-forested
- presence of:
  - > 30% sedges
  - bluegrass
  - glow moss

subhygric-subhydric

- crests to middle slopes
- south aspects
- coarse-textured soils, often < 1 m deep
- Pl or Fd dominate the canopy
- presence of > 5% of one or more of:
  - common juniper
  - kinnikinnick
  - pinegrass
  - soopolallie

- steep south aspects
- soils often < 50 cm deep
- canopy cover often < 30%
- Bl,Sxw uncommon
- presence of:
  - common juniper
  - kinnikinnick
  - bluebunch wheatgrass

xeric-very xeric

- middle slopes to flats
- often north aspects
- seepage often at 15-70 cm
- presence of:
  - black gooseberry
  - common horsetail
  - palmate coltsfoot

subhygric-hygric

- middle to upper slopes
- soils often medium-textured
- poorly developed understory (< 20% cover), primarily moss and Bl,Sxw regeneration

submesic-mesic

- gentle to steep slopes, if steep not south aspects
- soil depth > 50 cm
- canopy cover > 30%
- Bl,Sxw common
- presence of:
  - > 5% pinegrass
  - falsebox
  - heart-leaved arnica
  - showy aster

subxeric-submesic

OKANAGAN DRY MILD MONTANE SPRUCE VARIANT

Distribution: The MSdm1 variant is found mainly in the Okanagan Highlands, from Lumby to the U.S. border. It occurs above the IDFdm1 and below the ESSFdc1.

Elevational Range (Mean): 1300-1600 m

Climate: The climate of the MS is characterized by cold winters and moderately short, warm summers. The MSdm1 is slightly warmer and moister than the MSxk. The MSdm2 variant is slightly cooler and drier than the MSdm1.

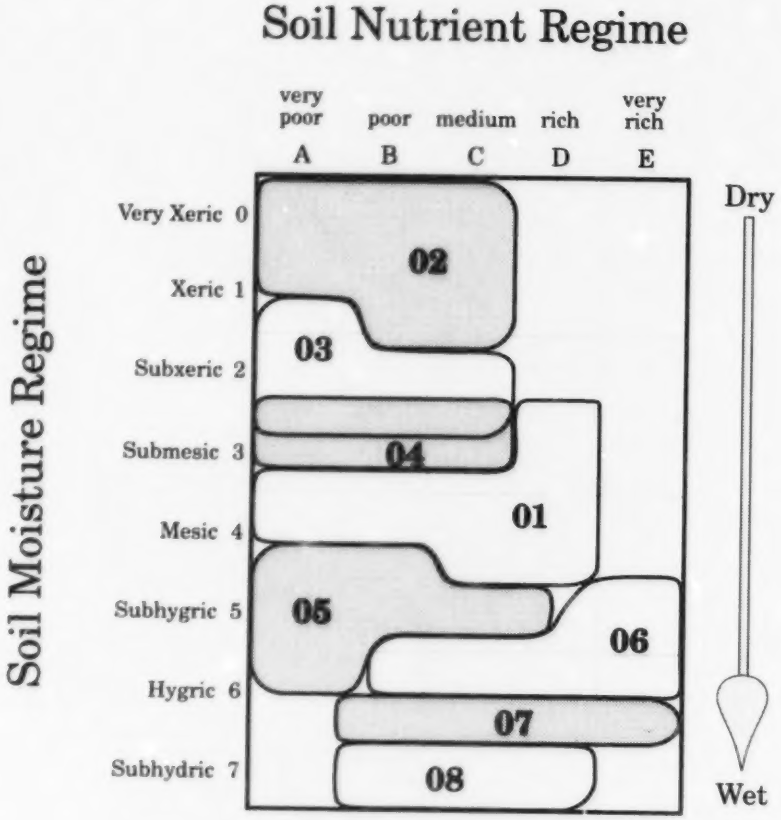
Vegetation and Soils

Zonal Sites: Seral Pl, climax Sxw and Bl, with occasional Lw, form mixed, maturing seral stands. A moss-dominated understory contains falsebox, black huckleberry, bunchberry, twinflower and grouseberry. Red-stemmed feathermoss dominates the moss layer. The common soils are Dystric and Eutric Brunisols and Gray Luvisols.

Dry Sites: Open, mature seral stands of Pl are prevalent. A dense, herb-dominated understory contains pinegrass, grouseberry and kinnikinnick. Bryophytes are generally sparse. On drier, south-facing slopes, scattered Fd is the climax tree and forms an open canopy, with a sparse and patchy understory consisting of big sagebrush, pinegrass and lichens.

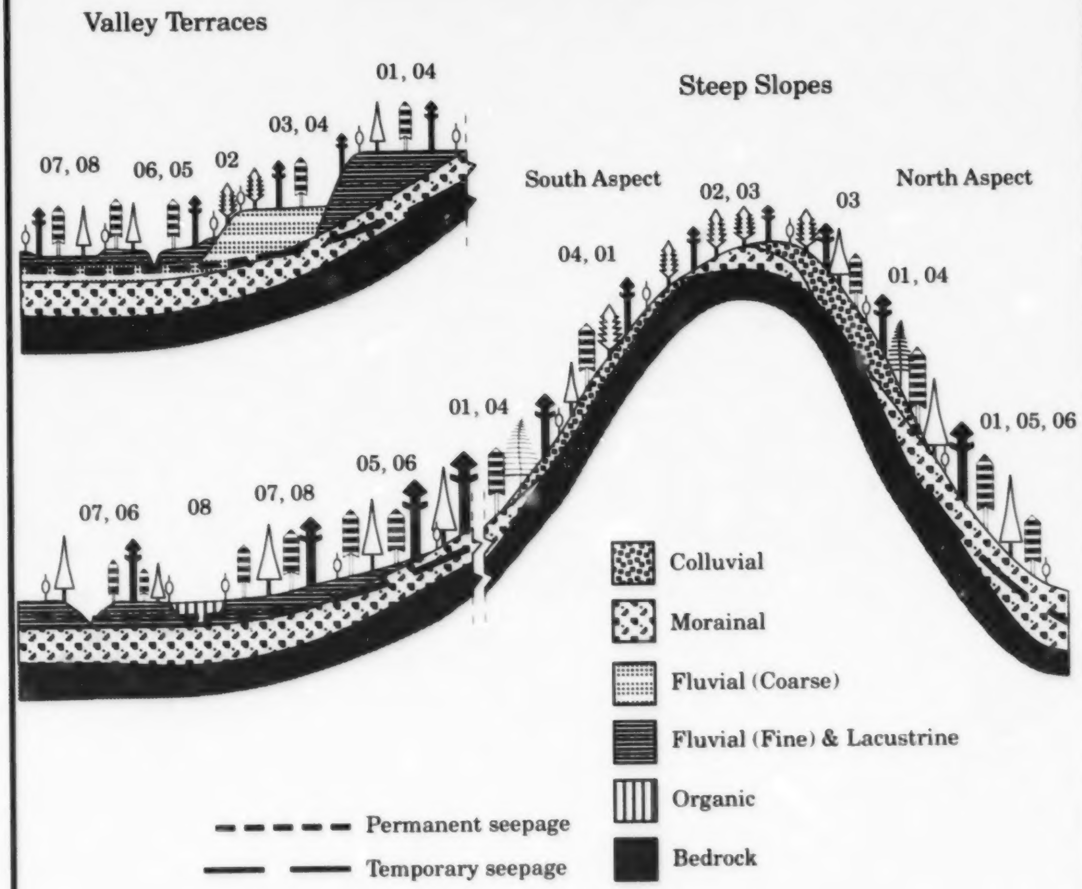
Wet Sites: On cool, north aspects, mixed mature seral stands of Pl, Sxw and Bl occur. The sparse shrub and herb layers contain black gooseberry, bunchberry and, frequently, queen's cup and five-leaved bramble. On wetter sites, common horsetails and sedges are prevalent, while on deep organics, a community of willows, sedges and glow moss occurs.

BGC Features: The MS is distinguished from the IDF by the presence of Bl and Sxw, and from the ESSF by the lack of white-flowered rhododendron and Sitka valerian. The presence of Lw and trapper's tea on azonal sites distinguishes the MSdm1 from the MSdm2.

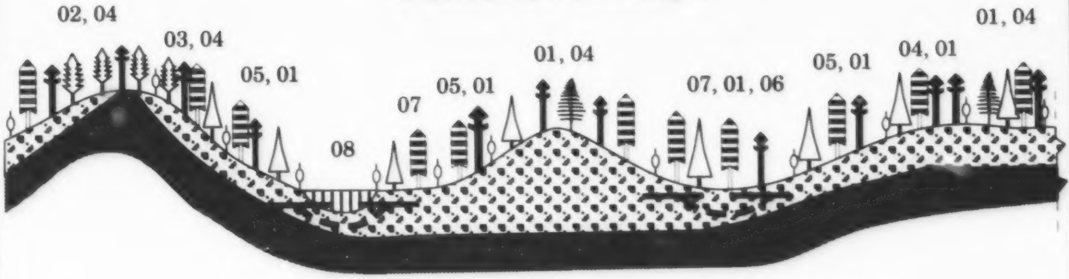


02	Fd — Big sage — Pinegrass
03	Pl — Grouseberry — Cladonia
04	Pl — Pinegrass — Kinnikinnick
Zonal 01	Sxw — Falsebox — Feathermoss
05	Sxw — Trapper's tea — Grouseberry
06	Sxw — Gooseberry
07	Sxw — Trapper's tea — Horsetail
08	Willow — Sedge

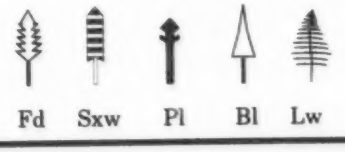
MS dm1


Valley Terraces

Steep Slopes


Plateaus & Gentle Slopes

Tree Species Key



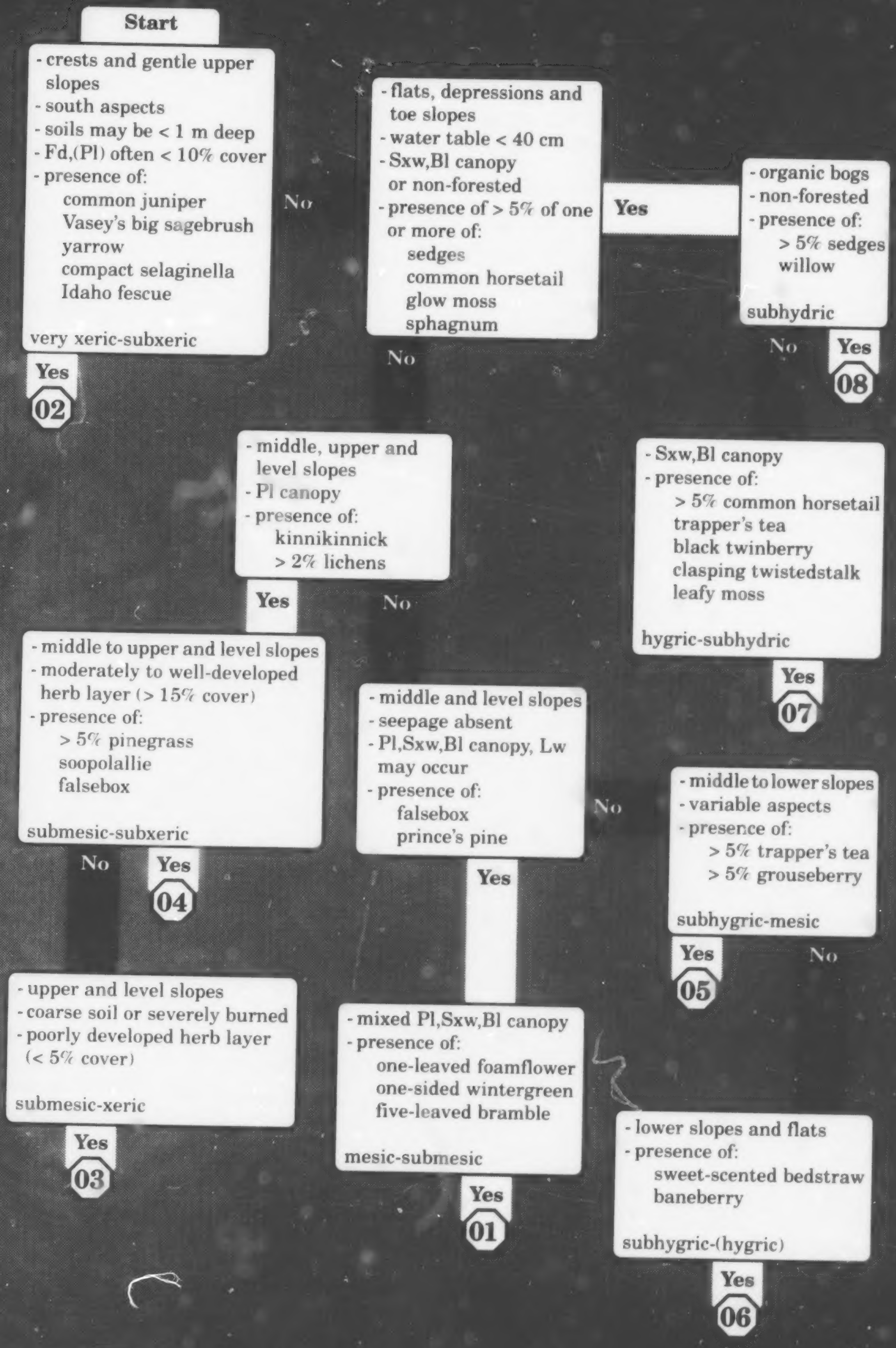
MS dm1 Vegetation Table

	Site Units	02	03	04	01	05	06	07	08	
Trees	*Pseudotsuga menziesii* var.*glauca*	█		▪	▪					interior Douglas-fir
	Pinus contorta		█	█	■	█	■			lodgepole pine
	Abies lasiocarpa		▪		■	■	■	■		subalpine fir
	Picea engelmannii x glauca		▪		■	■	█	█		hybrid white spruce
	Larix occidentalis				▪					western larch
Shrubs	*Artemisia tridentata* ssp.*vaseyana*	■								Vasey's big sagebrush
	Juniperus communis	▪		▪						common juniper
	Shepherdia canadensis			▪						soopolallie
	Spiraea betulifolia			▪	▪					birch-leaved spirea
	Paxistima myrsinites			▪	■					falsebox
	Alnus viridis				▪	▪	▪	▪		Sitka alder
	Vaccinium membranaceum				■	▪				black huckleberry
	Lonicera utahensis				▪	▪		▪		Utah honeysuckle
	Lonicera involucrata					▪		▪		black twinberry
	Ribes lacustre					▪	■	▪		black gooseberry
	Ledum glandulosum					█		■		trapper's tea
	Salix spp.								█	willows
Herbs	*Achillea millefolium*	▪								yarrow
	Selaginella densa	▪								compact selaginella
	Festuca idahoensis	▪								Idaho fescue
	Arctostaphylos uva-ursi		■	■						kinnikinnick
	Calamagrostis rubescens	■		█	■					pinegrass
	Vaccinium scoparium		■	█	■	█	▪	■		grouseberry
	Linnaea borealis		▪	▪	▪			▪		twinflower
	Cornus canadensis				▪	▪	▪	▪		bunchberry
	Tiarella unifoliata					▪				one-leaved foamflower
	Orthilia secunda					▪	▪			one-sided wintergreen
	Clintonia uniflora					▪	▪			queen's cup
	Rubus pedatus					■	▪	▪		five-leaved bramble
	Galium triflorum						▪			sweet-scented bedstraw
	Actaea rubra						▪			baneberry
	Streptopus amplexifolius							▪		clasping twistedstalk
	Equisetum arvense							█		common horsetail
	Carex spp.							■	█	sedges
Mosses & Lichens	*Peltigera rufescens*	▪								lichen
	Cladonia spp.	▪	■	▪						lichens
	Pleurozium schreberi				█	■	▪	▪		red-stemmed feathermoss
	Sphagnum capillaceum							▪		common red sphagnum
	Mnium spp.							■		leafy mosses
	Aulacomnium palustre							■	■	glow moss

MS dm1 Environment Table

Site Units	02	03	04	01	05	06	07	08
				Zonal				
Soil Moisture Regime	VX-SX	X-SM	SM-SX	M-SM	SHG-M	SHG-HG	HG-SHD	SHD
Prevailing Successional Stage Sampled	Maturing Climax	Maturing Seral					Maturing Climax	Young Climax
Aspect	South	All				North	All	N/A
Slope Gradient & Mesoslope Position	Gentle Upper & crest	Gentle Upper & level	Gentle Mid.-upp. & level	Gentle Middle & level	Gentle Middle - lower	Flat Lower - level	Flat Toe-level & depres.	Flat Level & depression
Soil Texture Class	Variable							Organic
Parent Materials	Cv,Mb	FGt,Mb	Variable	FGt,Mb	Mb,Fb	Fb,Mb	Fb, (Ov)	Ob
Important Soil Features	Some L	--------				W 30-80	W 0-35	W 0-5

MS dm1


Start
- crests and gentle upper slopes
- south aspects
- soils may be < 1 m deep
- Fd,(Pl) often < 10% cover
- presence of:
common juniper
Vasey's big sagebrush
yarrow
compact selaginella
Idaho fescue
very xeric-subxeric
Yes
02
No
- flats, depressions and toe slopes
- water table < 40 cm
- Sxw,Bl canopy or non-forested
- presence of > 5% of one or more of:
sedges
common horsetail
glow moss
sphagnum
Yes
- organic bogs
- non-forested
- presence of:
> 5% sedges
willow
subhydric
No
Yes
08
No
- middle, upper and level slopes
- Pl canopy
- presence of:
kinnikinnick
> 2% lichens
Yes
No
- Sxw,Bl canopy
- presence of:
> 5% common horsetail
trapper's tea
black twinberry
clasping twistedstalk
leafy moss
hygric-subhydric
Yes
07
- middle to upper and level slopes
- moderately to well-developed herb layer (> 15% cover)
- presence of:
> 5% pinegrass
soopolallie
falsebox
submesic-subxeric
No
Yes
04
- middle and level slopes
- seepage absent
- Pl,Sxw,Bl canopy, Lw may occur
- presence of:
falsebox
prince's pine
No
Yes
- middle to lower slopes
- variable aspects
- presence of:
> 5% trapper's tea
> 5% grouseberry
subhygric-mesic
Yes
05
No
- upper and level slopes
- coarse soil or severely burned
- poorly developed herb layer (< 5% cover)
submesic-xeric
Yes
03
- mixed Pl,Sxw,Bl canopy
- presence of:
one-leaved foamflower
one-sided wintergreen
five-leaved bramble
mesic-submesic
Yes
01
- lower slopes and flats
- presence of:
sweet-scented bedstraw
baneberry
subhygric-(hygric)
Yes
06

THOMPSON DRY MILD MONTANE SPRUCE VARIANT

Distribution: The MSdm2 occurs mainly on the lee side of the Cascade Mountains from Merritt to the U.S. border, and on the east side of the Thompson Plateau from Little Fort to Summerland. A substantial area also occurs northeast of Princeton, on the sidewalls of the Hayes and Trout Creek valleys. The MSdm2 occurs mainly above the IDFdk2 and below the ESSFdc2.

Elevational Range (Mean): 1275-1530 m

Climate: The MS subzone is characterized by cold winters and moderately short, warm summers. The MSdm2 is moister than the MSxk, drier than the MSdc and MSdm1, and warmer than the MSdc.

Vegetation and Soils

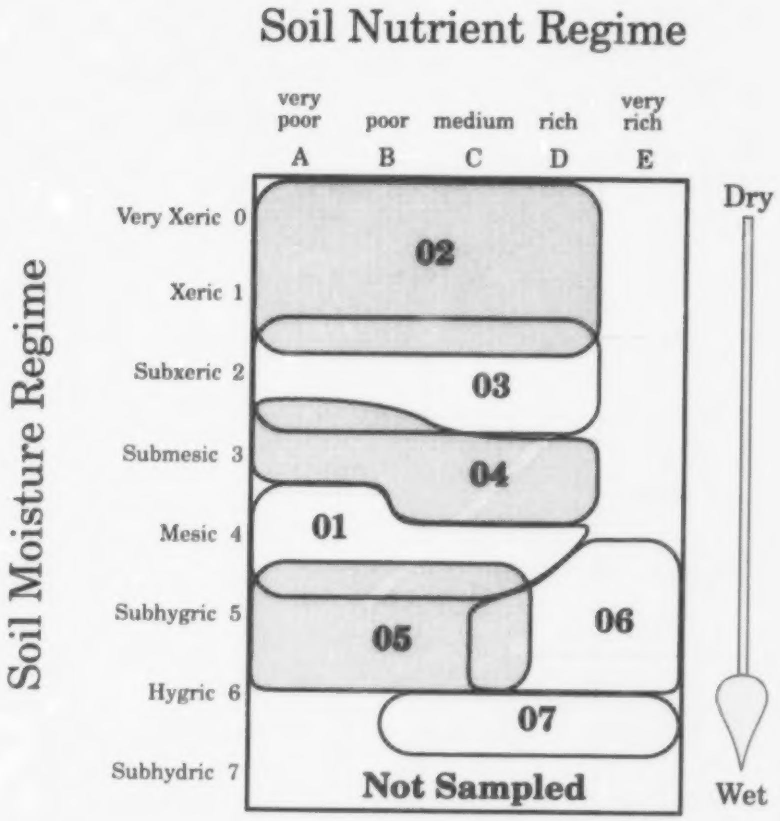
Zonal Sites: Forests are composed of mixed stands of Pl and the climax species Bl and Sxw. The moss-dominated understory contains falsebox, black huckleberry and grouseberry. Red-stemmed feathermoss is the major moss species. The common soils are Dystric Brunisols and Humo-Ferric Podzols.

Dry Sites: These sites support mature seral stands of Pl, with regenerating Bl and Fd. The stands are open and have an understory dominated by pinegrass. Falsebox is a common shrub. The moss and lichen layer is poorly developed. On steep, south-facing slopes with shallow soils, scattered individuals of Fd form open climax stands with an understory of common juniper, bluebunch wheatgrass, kinnikinnick and pinegrass.

Wet Sites: These sites support climax stands of Bl and Sxw, with scattered Fd and Pl. The shrubby understory is dominated by black gooseberry, with devil's club and oak fern occurring on fluvial sites. On wetter sites, grouseberry, common horsetail and glow moss are prevalent.

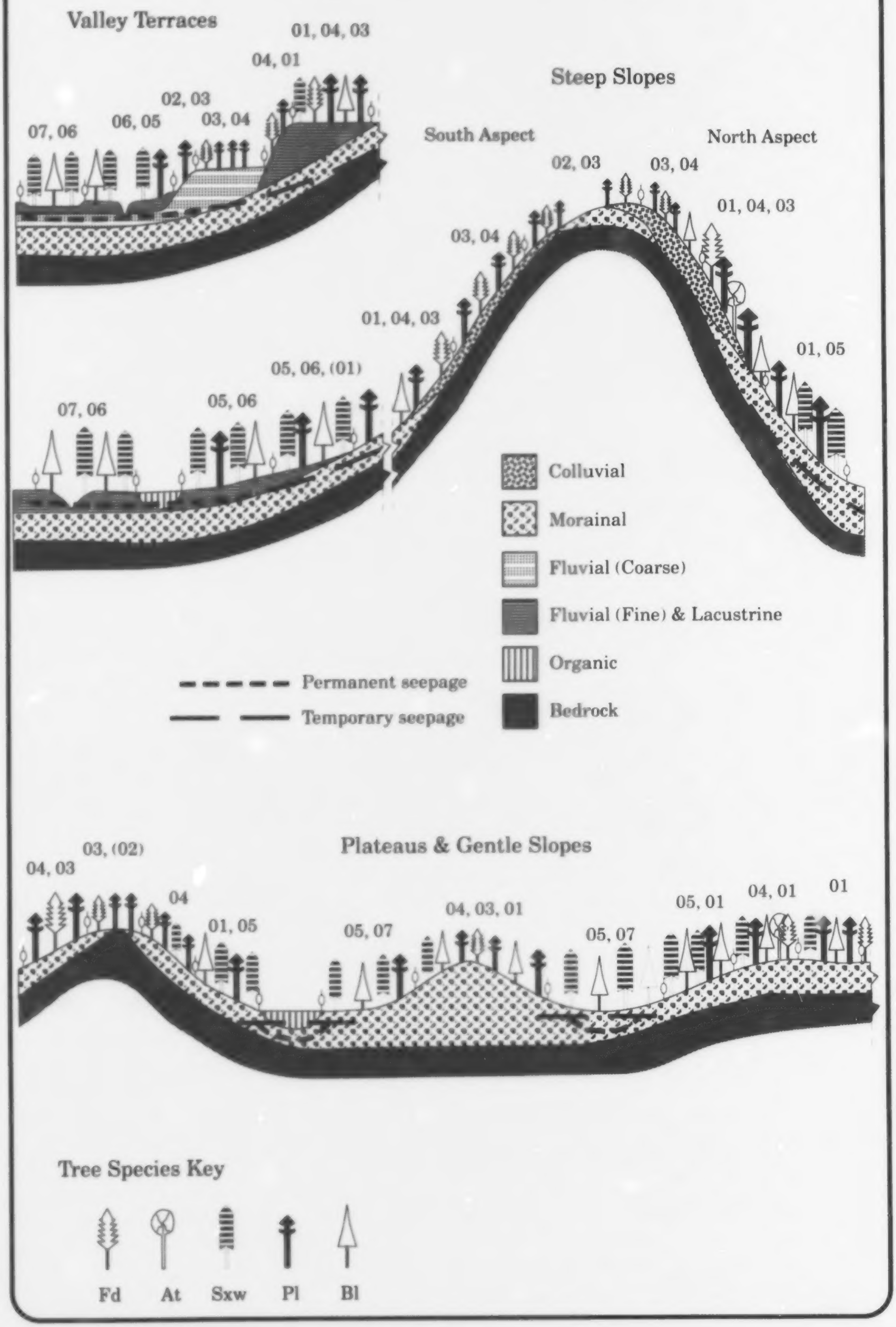
BGC Features: The MS is distinguished from the IDF by the presence of Bl and Sxw, and from the ESSF by the lack of white-flowered rhododendron and Sitka valerian. The lack of Bl and the abundance of pinegrass on mesic sites in the MSxk separate it from the MSdm2. The MSdm2 lacks trapper's tea and Lw; both occur in the MSdm1 landscape.

Comments: The MSdm2 represents the central concept of the MS zone in British Columbia



	02	Juniper — Bluebunch wheatgrass
	03	Pl — Juniper — Grouseberry
	04	Pl — Grouseberry — Pinegrass
Zonal	01	Sxw — Falsebox — Feathermoss
	05	Sxw — Gooseberry — Grouseberry
	06	Sxw — Gooseberry — Devil's club
	07	Sxw — Horsetail — Leafy moss

MS dm2


Valley Terraces
07, 06
06, 05
02, 03
03, 04
04, 01
01, 04, 03
Steep Slopes
South Aspect
North Aspect
02, 03
03, 04
01, 04, 03
03, 04
01, 04, 03
05, 06, (01)
05, 06
07, 06
01, 05
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
04, 03
03, (02)
04
01, 05
05, 07
04, 03, 01
05, 07
05, 01
04, 01
01
Tree Species Key
Fd
At
Sxw
Pl
Bl

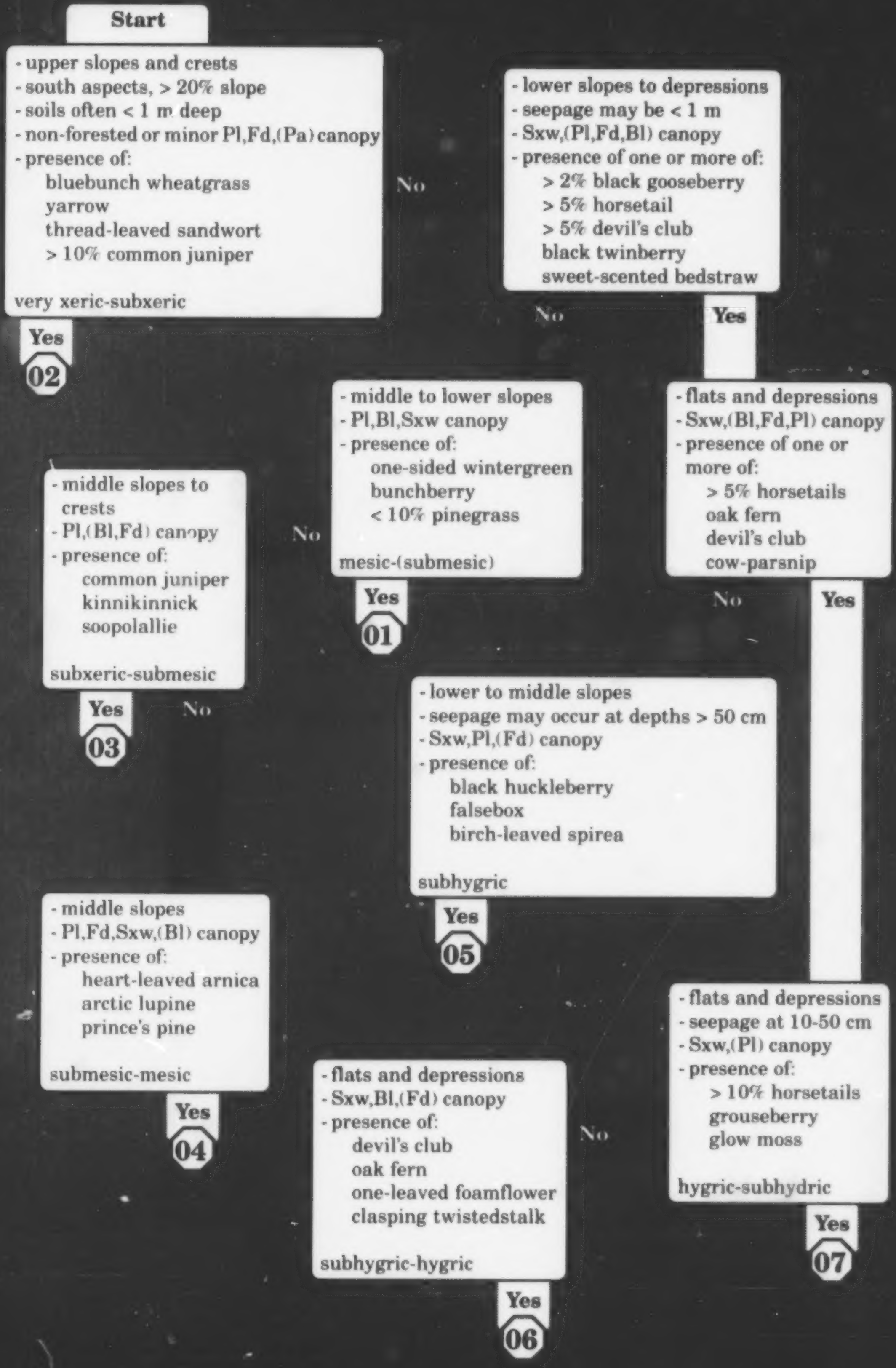
MS dm2 Vegetation Table

	Site Units	02	03	04	01	05	06	07	
Trees	*Pseudotsuga menziesii var.glauca*	▮	▮	■	■	▮	▮		interior Douglas-fir
	Pinus contorta		▬	▬	▬	■		▮	lodgepole pine
	Abies lasiocarpa		▮	▮	■	■	■	■	subalpine fir
	Picea engelmannii x glauca			▮	■	▬	▬	▬	hybrid white spruce
Shrubs	*Juniperus communis*	■	▮						common juniper
	Shepherdia canadensis		▮						soopolallie
	Spiraea betulifolia		▮	▮		▮			birch-leaved spirea
	Paxistima myrsinites		■	■	■	▮			falsebox
	Vaccinium membranaceum			▮	▮	▮			black huckleberry
	Lonicera utahensis		▮	▮	▮	▮	▮		Utah honeysuckle
	Lonicera involucrata					▮	▮	▮	black twinberry
	Ribes lacustre					■	▬	■	black gooseberry
	Oplopanax horridus						■		devil's club
Herbs	*Agropyron spicatum*	■							bluebunch wheatgrass
	Arenaria capillaris	▮							thread-leaved sandwort
	Achillea millefolium	▮							yarrow
	Arctostaphylos uva-ursi	■	▮						kinnikinnick
	Aster conspicuus			▮					showy aster
	Lupinus arcticus			▮					arctic lupine
	Calamagrostis rubescens	■	▬	▬	▮				pinegrass
	Arnica cordifolia			▮	▮	▮			heart-leaved arnica
	Chimaphila umbellata				▮				prince's pine
	Linnaea borealis		▮	▮	▮	▮	▮		twinflower
	Vaccinium scoparium		■	■	■	▮		■	grouseberry
	Orthilia secunda				▮	▮		▮	one-sided wintergreen
	Cornus canadensis				▮	▮	▮	▮	bunchberry
	Rubus pedatus					▮	▮	▮	five-leaved bramble
	Streptopus amplexifolius						▮		clasping twistedstalk
	Tiarella unifoliata						▮		one-leaved foamflower
	Gymnocarpium dryopteris						■		oak fern
	Equisetum scirpoides							▮	dwarf scouring-rush
	Equisetum arvense						▮	■	common horsetail
Mosses	*Pleurozium schreberi*		▮	■	▬	■	▮	■	red-stemmed feathermoss
	Aulacomnium palustre							■	glow moss
	Mnium spp.							■	leafy mosses

MS dm2 Environment Table

Site Units	02	03	04	01	05	06	07
				Zonal			
Soil Moisture Regime	VX-SX	X-SM	SM-M	M-SM	SHG	SHG-HG	HG-SHD
Prevailing Successional Stage Sampled	Young Climax	Maturing Seral				Maturing Climax	
Aspect	South	All				N/A	
Slope Gradient & Mesoslope Position	Gentle - steep Upper & crest	Gentle - steep Middle & crest	Gentle Lower - middle			Flat - gentle Lower - depression	
Soil Texture Class	Coarse		Medium	Coarse		Medium	
Parent Materials	Cv	Cv,Mb	Mb			Fb	
Important Soil Features	L 20-100	Some L	--------		Some W	W 25-100	W 10-50

MS dm2



- upper slopes and crests
- south aspects, > 20% slope
- soils often < 1 m deep
- non-forested or minor Pl,Fd,(Pa) canopy
- presence of:
    - bluebunch wheatgrass
    - yarrow
    - thread-leaved sandwort
    - > 10% common juniper

very xeric-subxeric

- lower slopes to depressions
- seepage may be < 1 m
- Sxw,(Pl,Fd,Bl) canopy
- presence of one or more of:
    - > 2% black gooseberry
    - > 5% horsetail
    - > 5% devil's club
    - black twinberry
    - sweet-scented bedstraw

- middle to lower slopes
- Pl,Bl,Sxw canopy
- presence of:
    - one-sided wintergreen
    - bunchberry
    - < 10% pinegrass

mesic-(submesic)

- flats and depressions
- Sxw,(Bl,Fd,Pl) canopy
- presence of one or more of:
    - > 5% horsetails
    - oak fern
    - devil's club
    - cow-parsnip

- middle slopes to crests
- Pl,(Bl,Fd) canopy
- presence of:
    - common juniper
    - kinnikinnick
    - soopolallie

subxeric-submesic

- lower to middle slopes
- seepage may occur at depths > 50 cm
- Sxw,Pl,(Fd) canopy
- presence of:
    - black huckleberry
    - falsebox
    - birch-leaved spirea

subhygric

- middle slopes
- Pl,Fd,Sxw,(Bl) canopy
- presence of:
    - heart-leaved arnica
    - arctic lupine
    - prince's pine

submesic-mesic

- flats and depressions
- seepage at 10-50 cm
- Sxw,(Pl) canopy
- presence of:
    - > 10% horsetails
    - grouseberry
    - glow moss

hygric-subhydric

- flats and depressions
- Sxw,Bl,(Fd) canopy
- presence of:
    - devil's club
    - oak fern
    - one-leaved foamflower
    - clasping twistedstalk

subhygric-hygric

VERY DRY COOL MONTANE SPRUCE SUBZONE

Distribution: The MSxk subzone occurs at mid-elevations in the central part of the Thompson Plateau, from the U.S. border to the Bonaparte Plateau, and in the Clear and Camelsfoot ranges on the Fraser Plateau. It is found above the IDFdk1 and below the ESSFxc.

Elevational Range (Mean): 1450-1650 m

Climate: The MS zone has cold winters and moderately short, warm summers. The MSxk is the driest MS subzone in the KFR and moisture deficits commonly occur throughout the growing season. It is slightly cooler than the MSdm.

Vegetation and Soils

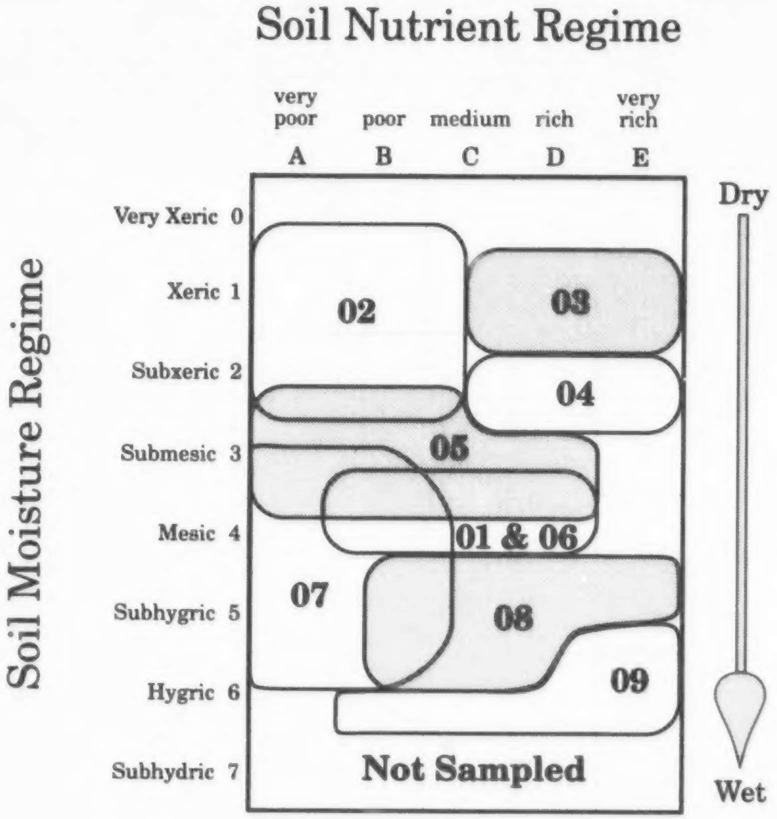
Zonal Sites: The tree canopy is moderately open and dominated by Pl, with minor amounts of regenerating Sxw and Bl. In these mature seral stands, the understory is characterized by a well-developed herb layer dominated by pinegrass and grouseberry, with lesser amounts of arctic lupine, twinflower and heart-leaved arnica. A poorly developed moss layer is dominated by red-stemmed feathermoss. Soils are commonly Dystric Brunisols and occasionally Gray Luvisols.

Dry Sites: Open, mature seral stands are composed of Pl and Fd. An open, mixed shrub-herb community contains a high cover of common juniper, pinegrass and kinnikinnick. The bryophyte layer is poorly developed, although the lichen, *Peltigera aphthosa*, is constantly present.

Wet Sites: Mature seral stands are characterized by a dense cover of Sxw, Bl and the successional species Pl. The diverse, herb-dominated understory consists of grouseberry, twinflower, heart-leaved arnica and black gooseberry with the scattered occurrence of leafy moss. On wetter sites, Utah honeysuckle, horsetails and leafy moss are common.

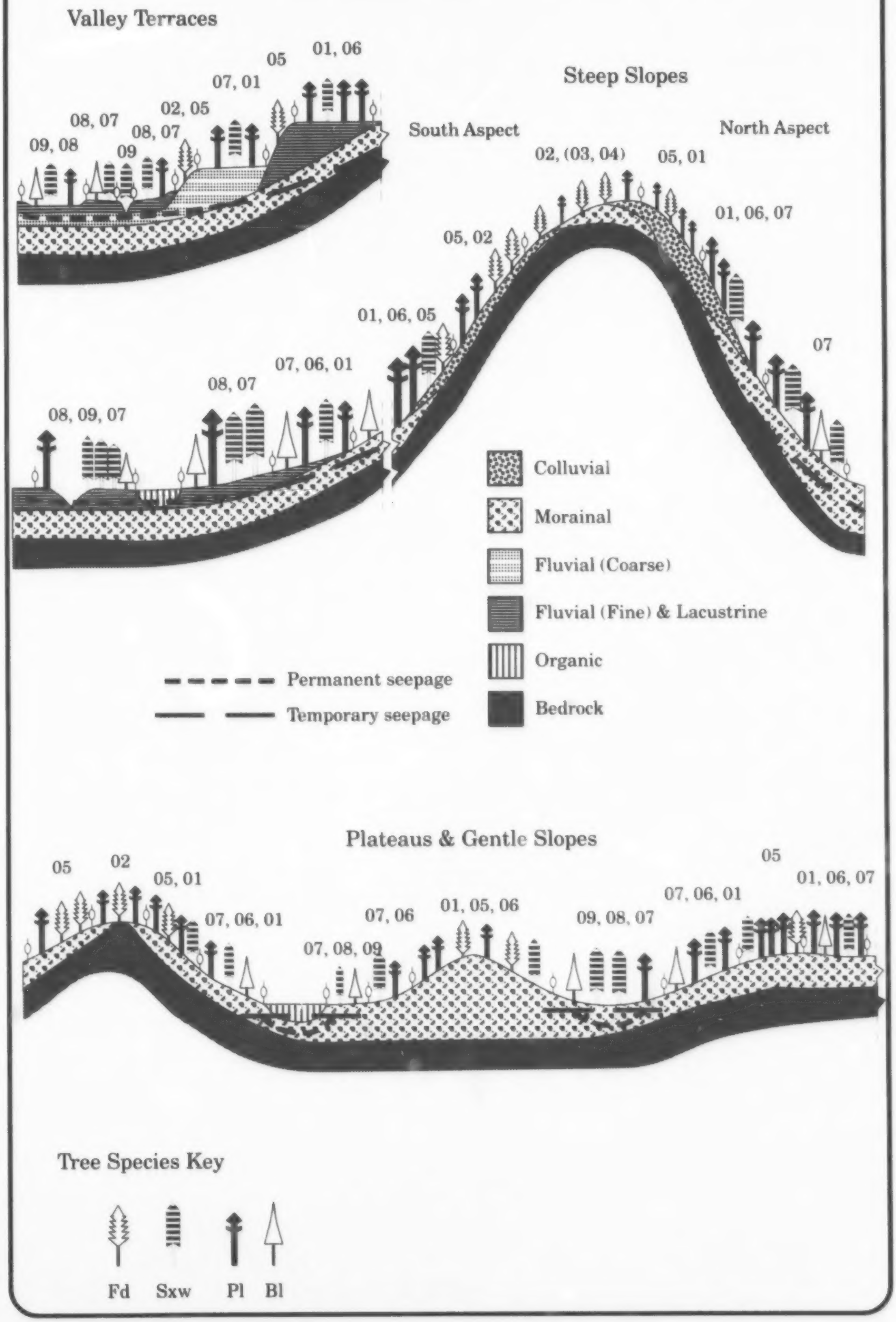
BGC Features: The MS is distinguished from the IDF by the presence of Bl and Sxw on zonal sites, and from the ESSF by the lack of white-flowered rhododendron and Sitka valerian. The abundance of pinegrass on zonal sites distinguishes the MSxk from other MS subzones in the KFR.

Comments: A history of wildfires has resulted in mature seral Pl stands dominating the landscape of this subzone. Climax stands of Sxw and Bl rarely occur.



02	Fd — Juniper — Grouseberry
03	Bluebunch wheatgrass — Junegrass
04	Big sage — Pinegrass
05	FdPl — Pinegrass — Arnica
Zonal 01	Pl — Pinegrass — Lupine
06	Pl — Falsebox — Lupine
07	Sxw — Trapper's tea — Grouseberry
08	Sxw — Gooseberry — Grouseberry
09	Sxw — Horsetail — Leafy moss

MS xk


Valley Terraces
09, 08
08, 07
09
08, 07
02, 05
07, 01
05
01, 06
Steep Slopes
South Aspect
North Aspect
02, (03, 04)
05, 01
01, 06, 07
05, 02
01, 06, 05
07, 06, 01
08, 07
08, 09, 07
07
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
05
02
05, 01
07, 06, 01
07, 08, 09
07, 06
01, 05, 06
09, 08, 07
07, 06, 01
05
01, 06, 07
Tree Species Key
Fd
Sxw
Pl
Bl

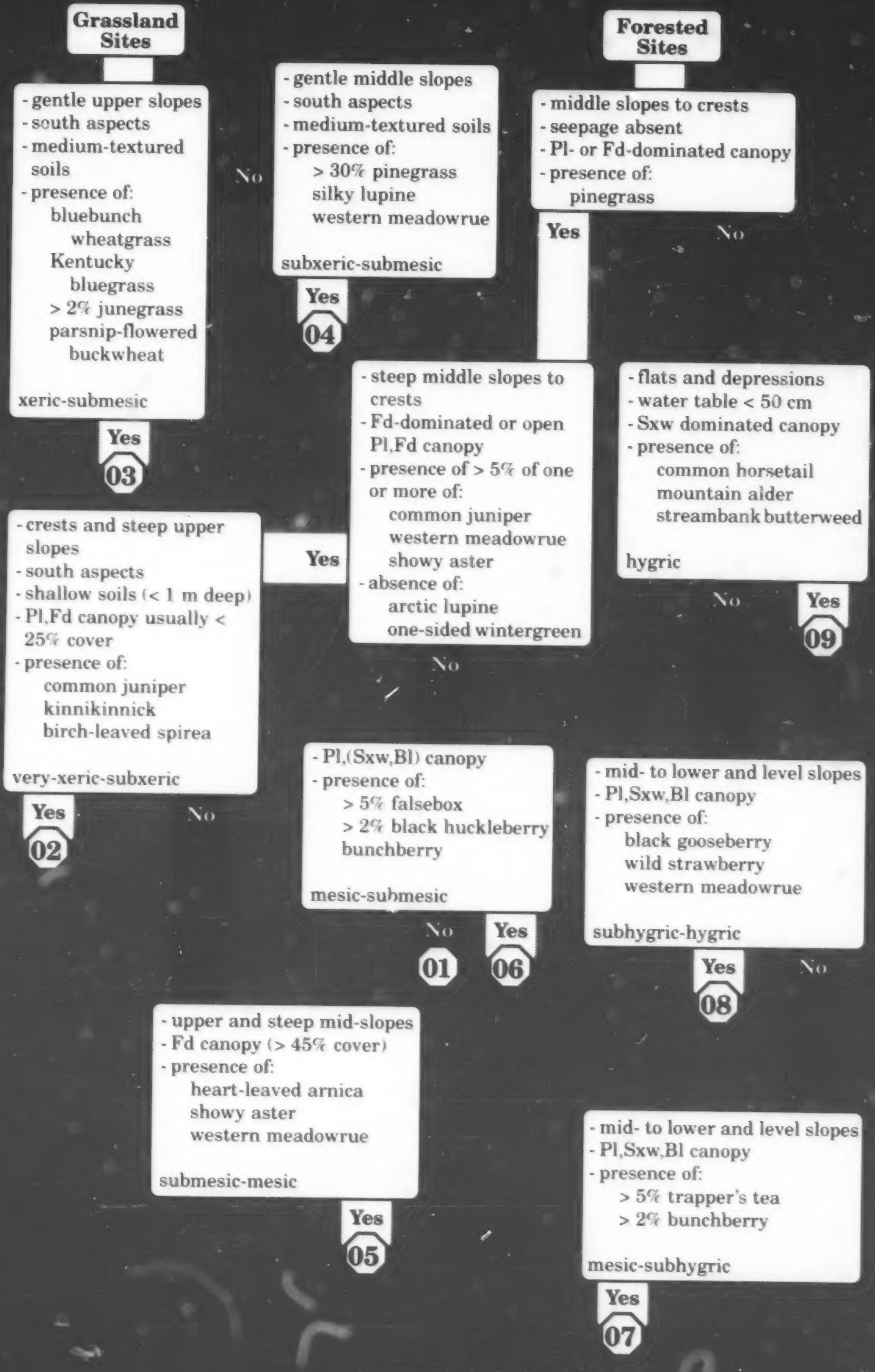
MS xk Vegetation Table

	Site Units	02	03	04	05	01	06	07	08	09	
Trees	*Pseudotsuga menziesii* var. *glauca*	■			▬				▮		interior Douglas-fir
	Pinus contorta	■			▮	▬	▬	▬	▬	▮	lodgepole pine
	Picea engelmannii x glauca					■	▮	■	▬	▬	hybrid white spruce
	Abies lasiocarpa						▮	■	■	■	subalpine fir
Shrubs	*Juniperus communis*	■	■								common juniper
	Spiraea betulifolia	▮					▮				birch-leaved spirea
	Artemisia tridentata ssp. *vaseyana*			▬							Vasey's big sagebrush
	Vaccinium membranaceum	▮					▮				black huckleberry
	Paxistima myrsinites	▮					■				falsebox
	Ledum glandulosum							▬			trapper's tea
	Ribes lacustre								■	■	black gooseberry
	Lonicera involucrata									■	black twinberry
	Alnus incana									▮	mountain alder
Herbs	*Poa pratensis*		■								Kentucky bluegrass
	Agropyron spicatum		■								bluebunch wheatgrass
	Eriogonum heracleoides		▮								parsnip-flowered buckwheat
	Koeleria macrantha		■	▮							junegrass
	Achillea millefolium		■	■							yarrow
	Festuca spp.		▮	■							fescues
	Geum triflorum		▮	■							old man's whiskers
	Lupinus sericeus			■							silky lupine
	Arenaria spp.			■							sandworts
	Arctostaphylos uva-ursi	■									kinnikinnick
	Aster conspicuus				■		▮				showy aster
	Lupinus arcticus	▮				■	▬	▮			arctic lupine
	Calamagrostis rubescens	■		▬	▬	▬	■	▮		▮	pinegrass
	Thalictrum occidentale			■	■				▮	▮	western meadowrue
	Fragaria virginiana			■	▮	▮	▮		▮	▮	wild strawberry
	Vaccinium scoparium	■			▮	▬	▬	▬	■	▮	grouseberry
	Linnaea borealis	▮			▮	■	■	■	■	▮	twinflower
	Arnica cordifolia				■	■	■	■	■	▮	heart-leaved arnica
	Orthilia secunda					▮	▮	▮	▮		one-sided wintergreen
	Cornus canadensis						▮	■		▮	bunchberry
	Senecio pseudaureus									■	streambank butterweed
	Equisetum arvense									■	common horsetail
Mosses & Lichens	*Cladonia* spp.	■									lichens
	Peltigera aphthosa	■			▮			▮	▮		lichen
	Pleurozium schreberi	▮			▮	■	■	▬	■		red-stemmed feathermoss
	Mnium spp.									■	leafy mosses

MS xk Environment Table

Site Units	02	03	04	05	01 Zonal	06	07	08	09
Soil Moisture Regime	VX-SX	X-SX	SX-SM	SM-M	M-SM	SM-M	M-HG	SHG-HG	HG
Prevailing Successional Stage Sampled	Maturing Seral					Young Seral	Maturing Seral		Maturing Climax
Aspect	South			All					N/A
Slope Gradient & Mesoslope Position	Steep Middle, upper & crest	Gentle Upper	Gentle Middle	Steep Middle - upper	Gentle Middle		Gentle Mid.-low. & depres.	Gentle Mid.-low. & level	Flat Level & depression
Soil Texture Class	Medium			Variable	Medium		Coarse	Variable	
Parent Materials	Mv,Cv	Mb,Cb		Mb		Mb,Fb	Fb,Mb	Mb,Fb	Fb,Mb
Important Soil Features	L 25-100	--------		--------			Some W	W 40-90	W 30-50

MS xk



Grassland Sites

- gentle upper slopes
- south aspects
- medium-textured soils
- presence of:
  - bluebunch wheatgrass
  - Kentucky bluegrass
  - > 2% junegrass
  - parsnip-flowered buckwheat

xeric-submesic

- gentle middle slopes
- south aspects
- medium-textured soils
- presence of:
  - > 30% pinegrass
  - silky lupine
  - western meadowrue

subxeric-submesic

- crests and steep upper slopes
- south aspects
- shallow soils (< 1 m deep)
- Pl,Fd canopy usually < 25% cover
- presence of:
  - common juniper
  - kinnikinnick
  - birch-leaved spirea

very-xeric-subxeric

Forested Sites

- middle slopes to crests
- seepage absent
- Pl- or Fd-dominated canopy
- presence of:
  - pinegrass

- steep middle slopes to crests
- Fd-dominated or open Pl,Fd canopy
- presence of > 5% of one or more of:
  - common juniper
  - western meadowrue
  - showy aster
- absence of:
  - arctic lupine
  - one-sided wintergreen

- flats and depressions
- water table < 50 cm
- Sxw dominated canopy
- presence of:
  - common horsetail
  - mountain alder
  - streambank butterweed

hygric

- Pl,(Sxw,Bl) canopy
- presence of:
  - > 5% falsebox
  - > 2% black huckleberry
  - bunchberry

mesic-submesic

- mid- to lower and level slopes
- Pl,Sxw,Bl canopy
- presence of:
  - black gooseberry
  - wild strawberry
  - western meadowrue

subhygric-hygric

- upper and steep mid-slopes
- Fd canopy (> 45% cover)
- presence of:
  - heart-leaved arnica
  - showy aster
  - western meadowrue

submesic-mesic

- mid- to lower and level slopes
- Pl,Sxw,Bl canopy
- presence of:
  - > 5% trapper's tea
  - > 2% bunchberry

mesic-subhygric

MOIST MILD
SUB-BOREAL SPRUCE SUBZONE

Distribution: The SBSmm is located on the west side of the North Thompson River, from Mann Creek (TFL 18) south to Eakin Creek. It also occurs on the north-facing slopes, including Reg Christie Creek, southeast of Vavenby. It occurs above the IDFmw2 or ICHmk2 and below either the ESSFwc2 or ESSFdc2.

Elevational Range (Mean): 1000-1450 m

Climate: The climate of the SBS zone is characterized by cold winters and cool summers. The SBSmm receives moderate amounts of precipitation relative to other SBS subzones.

Vegetation and Soils

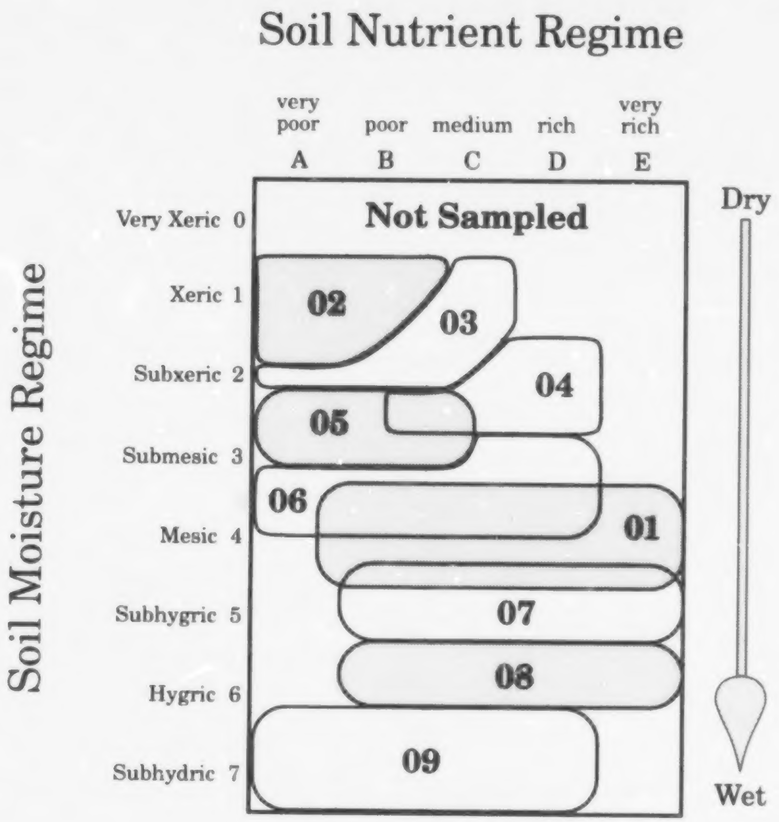
Zonal Sites: Bl and Sxw form dense, young climax stands. Pl is present in successional stands. The moderately dense understory consists of falsebox, black huckleberry and minor amounts of black twinberry, twinflower, bunchberry and five-leaved bramble. Red-stemmed feathermoss and knight's plume form a well-developed moss layer. The common soils are Dystric Brunisols and Humo-Ferric Podzols.

Dry Sites: As a result of fire, dense, mature seral stands of Pl exist. The shrubby understory is dominated by common juniper, soopolallie, falsebox and birch-leaved spirea. Pinegrass, twinflower and, to a lesser extent prince's pine, dominate the open herb layer. A low cover of red-stemmed feathermoss is present. On rocky granitic tills, the understory is mainly composed of black huckleberry, twinflower and a moderate cover of *Dicranum* spp.

Wet Sites: These sites are characterized by moderately dense, young climax stands of Bl and Sxw. A rich herb-dominated understory consists of oak fern, five-leaved bramble, one-leaved foamflower, oval-leaved blueberry and black gooseberry. A low cover of knight's plume and red-stemmed feathermoss frequently occurs.

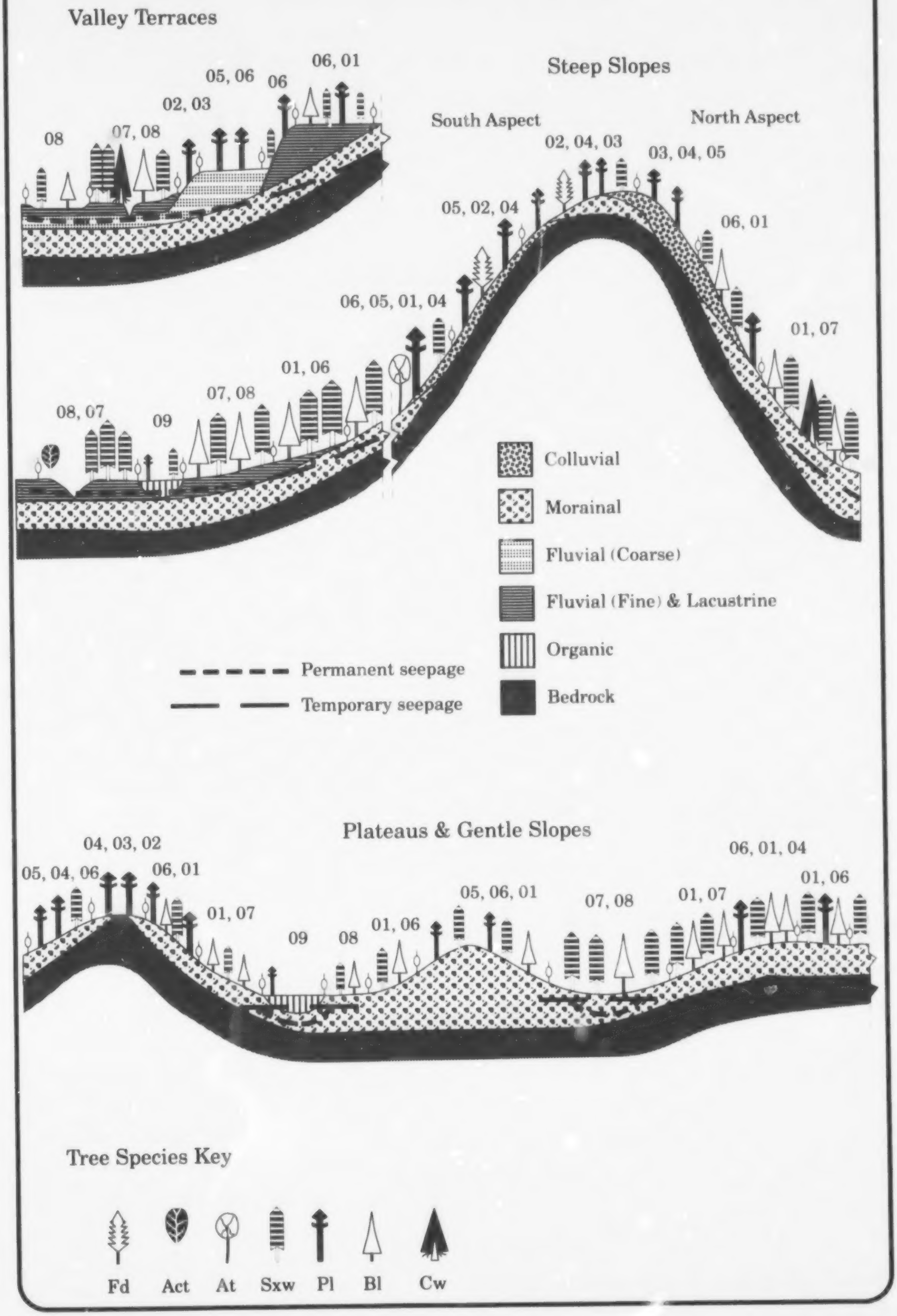
BGC Features: The absence of grouseberry and Utah honeysuckle in the SBS separates it from the closely aligned MS zone. The absence of white-flowered rhododendron and Sitka valerian in the SBSmm distinguishes it from the adjacent ESSF.

Comments: Site unit 04 has a limited distribution.

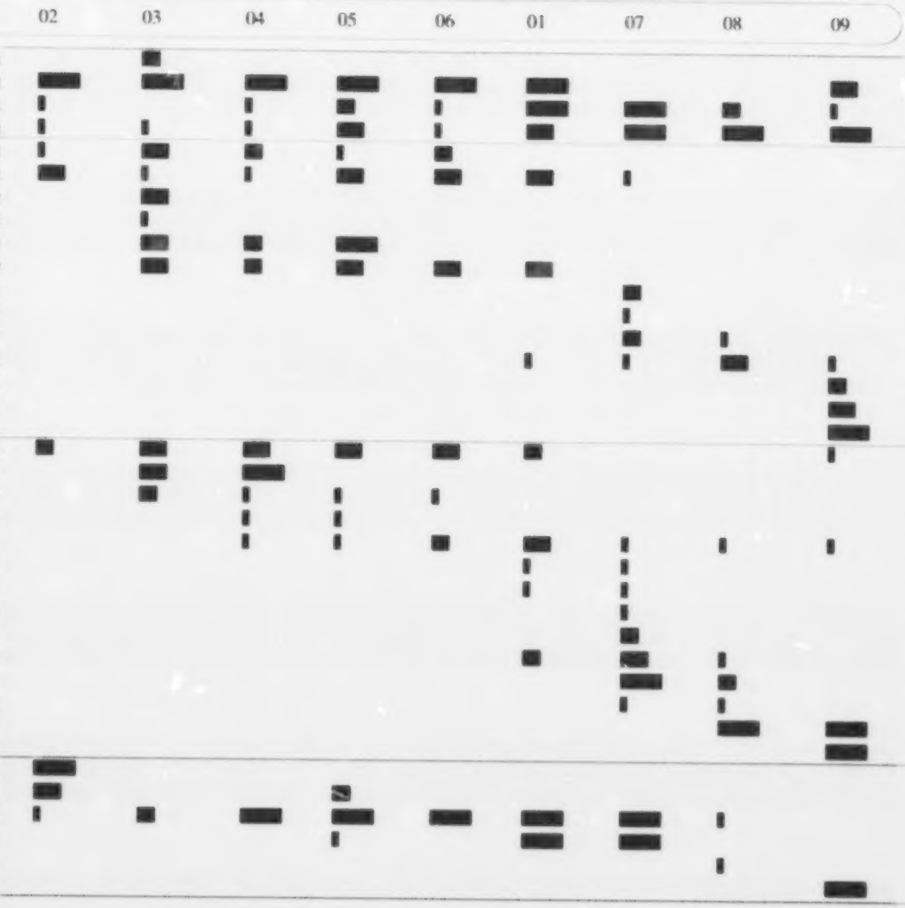


02	Pl — Huckleberry — Cladonia
03	Pl — Douglas-fir — Juniper
04	Pl — Soopolallie — Pinegrass
05	Sxw — Soopolallie — Falsebox
Zonal 01	Sxw — Falsebox — Knight's plume
06	Sxw — Huckleberry — Falsebox
07	Sxw — Oak fern
08	Sxw — Horsetail
09	Sedge — Sphagnum

SBS mm


Valley Terraces
08
07, 08
02, 03
05, 06
06
06, 01
Steep Slopes
South Aspect
North Aspect
02, 04, 03
03, 04, 05
05, 02, 04
06, 01
06, 05, 01, 04
01, 07
01, 06
07, 08
08, 07
09
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
05, 04, 06
04, 03, 02
06, 01
01, 07
09
08
01, 06
05, 06, 01
07, 08
01, 07
06, 01, 04
01, 06
Tree Species Key
Fd
Act
At
Sxw
Pl
Bl
Cw

SBS mm Vegetation Table

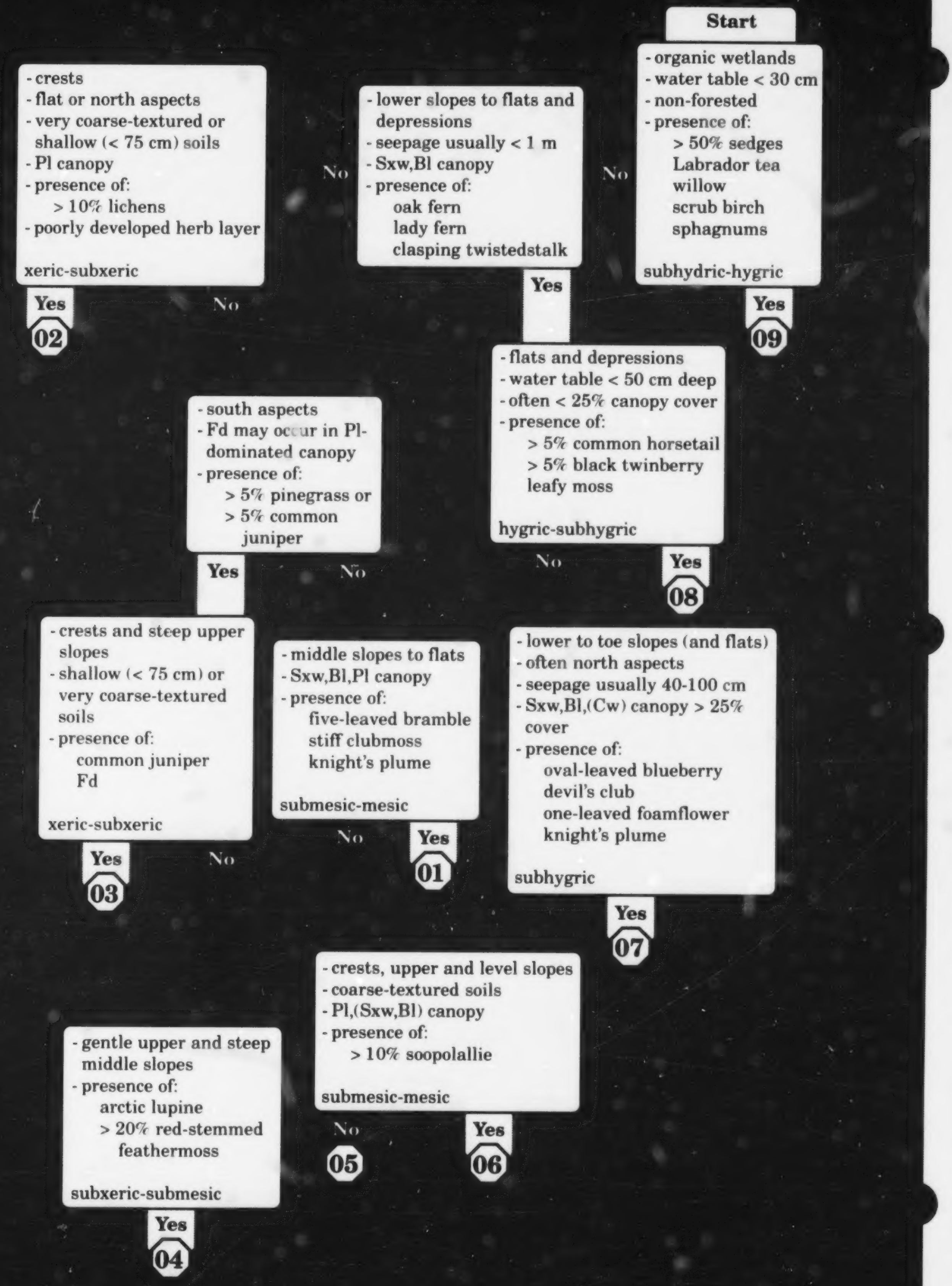


Trees	*Pseudotsuga menziesii var.glauca*	interior Douglas-fir
	Pinus contorta	lodgepole pine
	Abies lasiocarpa	subalpine fir
	Picea engelmannii x glauca	hybrid white spruce
Shrubs	*Spiraea betulifolia*	birch-leaved spirea
	Vaccinium membranaceum	black huckleberry
	Juniperus communis	common juniper
	Amelanchier alnifolia	saskatoon
	Shepherdia canadensis	soopolallie
	Paxistima myrsinites	falsebox
	Vaccinium ovalifolium	oval-leaved blueberry
	Oplopanax horridus	devil's club
	Ribes lacustre	black gooseberry
	Lonicera involucrata	black twinberry
	Betula glandulosa	scrub birch
	Salix spp.	willows
	Ledum groenlandicum	Labrador tea
Herbs	*Linnaea borealis*	twinflower
	Calamagrostis rubescens	pinegrass
	Chimaphila umbellata	prince's pine
	Lupinus arcticus	arctic lupine
	Cornus canadensis	bunchberry
	Clintonia uniflora	queen's cup
	Lycopodium annotinum	stiff clubmoss
	Athyrium filix-femina	lady fern
	Tiarella unifoliata	one-leaved foamflower
	Rubus pedatus	five-leaved bramble
	Gymnocarpium dryopteris	oak fern
	Streptopus amplexifolius	clasping twistedstalk
	Equisetum arvense	common horsetail
	Carex spp.	sedges
Mosses & Lichens	*Cladonia* spp.	lichens
	Dicranum spp.	mosses
	Pleurozium schreberi	red-stemmed feathermoss
	Ptilium crista-castrensis	knight's plume
	Mnium spp.	leafy mosses
	Sphagnum spp.	sphagnums

SBS mm Environment Table

Site Units	02	03	04	05	06	01 **Zonal**	07	08	09
Soil Moisture Regime	X-SX	X-SX	SX-SM	SM-SX	SM-M	M-SM	SHG	HG-SHG	SHD-HG
Prevailing Successional Stage Sampled	Maturing Seral						Young Climax		
Aspect	North	South			All			N/A	
Slope Gradient & Mesoslope Position	Gentle Upper & crest	Steep Upper & crest	Gentle - steep Middle - upper	Gentle Mid.-upp. & level	Gentle Level & middle		Lower Level & depression	Flat Level & depression	
Soil Texture Class	Coarse		Variable	Coarse	Variable	Medium	Variable		Organic
Parent Materials	Mv,Mb	Mv,FGt	Mb,Cb	Mb,(FGt)	Mb,(Fb)	Mb	Fb,(Mb)	Fb	Ob,Ov/Fb
Important Soil Features	L <75 or V. Coarse		----	Coarse	--------		W 40-100	W 20-50	W 5-30

SBS mm



- organic wetlands
- water table < 30 cm
- non-forested
- presence of:
  - > 50% sedges
  - Labrador tea
  - willow
  - scrub birch
  - sphagnums

subhydric-hygric

- lower slopes to flats and depressions
- seepage usually < 1 m
- Sxw,Bl canopy
- presence of:
  - oak fern
  - lady fern
  - clasping twistedstalk

- crests
- flat or north aspects
- very coarse-textured or shallow (< 75 cm) soils
- Pl canopy
- presence of:
  - > 10% lichens
- poorly developed herb layer

xeric-subxeric

- flats and depressions
- water table < 50 cm deep
- often < 25% canopy cover
- presence of:
  - > 5% common horsetail
  - > 5% black twinberry
  - leafy moss

hygric-subhygric

- south aspects
- Fd may occur in Pl-dominated canopy
- presence of:
  - > 5% pinegrass or
  - > 5% common juniper

- crests and steep upper slopes
- shallow (< 75 cm) or very coarse-textured soils
- presence of:
  - common juniper
  - Fd

xeric-subxeric

- middle slopes to flats
- Sxw,Bl,Pl canopy
- presence of:
  - five-leaved bramble
  - stiff clubmoss
  - knight's plume

submesic-mesic

- lower to toe slopes (and flats)
- often north aspects
- seepage usually 40-100 cm
- Sxw,Bl,(Cw) canopy > 25% cover
- presence of:
  - oval-leaved blueberry
  - devil's club
  - one-leaved foamflower
  - knight's plume

subhygric

- crests, upper and level slopes
- coarse-textured soils
- Pl,(Sxw,Bl) canopy
- presence of:
  - > 10% soopolallie

submesic-mesic

- gentle upper and steep middle slopes
- presence of:
  - arctic lupine
  - > 20% red-stemmed feathermoss

subxeric-submesic

ICH mk1

KOOTENAY MOIST COOL
INTERIOR CEDAR – HEMLOCK VARIANT

Distribution: The ICHmk1 subzone occurs on north- and west- facing slopes northeast and east of Okanagan Lake, from Armstrong to south of Kelowna and encompassing Mission Creek, its tributaries, and Coldstream Creek. On the west side of Okanagan Lake, it covers an area between the Salmon River and Fintry. Small patches are found on north-facing slopes west of Salmon Arm and on south-facing slopes along the Shuswap River north of Enderby. It generally occurs above the IDFmw1 and below the MSdm1. This variant also occurs in the east Kootenays, near Fernie, and the upper Kettle drainage.

Elevational Range (Mean): 1100-1500 m

Climate: The ICH is warmer than the MS and ESSF and wetter than the IDF and MS. The ICHmk1 represents a climatic transition between the ICH and the MS. We speculate that the ICHmk1 is slightly drier and warmer in summer, with more growing degree days and a slightly longer frost-free period than the ICHmk2.

Vegetation and Soils

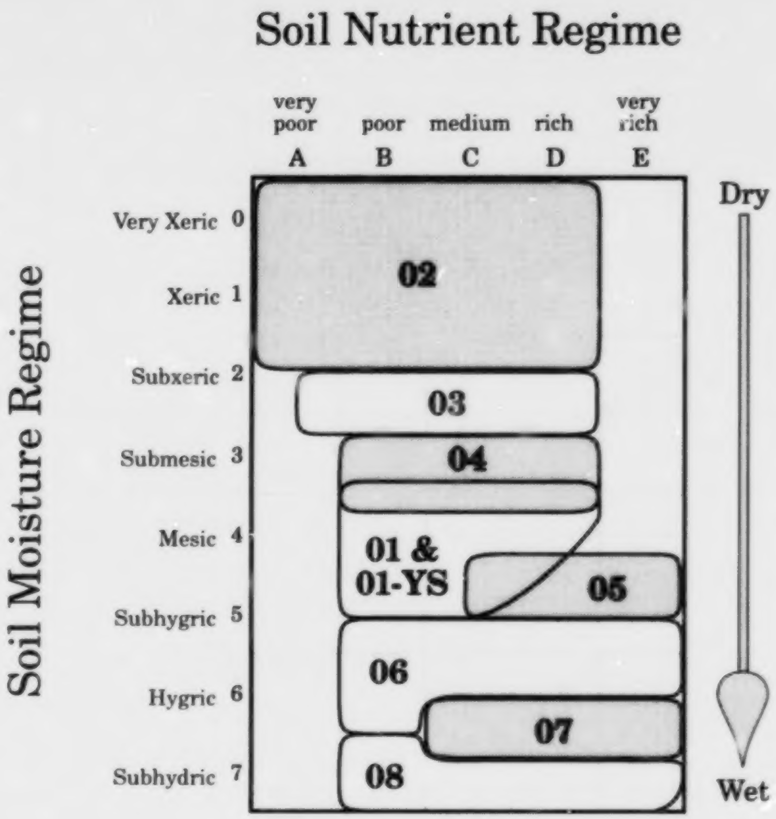
Zonal Sites: Mature seral stands have a mixed tree canopy dominated by Pl and lesser amounts of Fd, Lw and the climax species Sxw, Cw and Bl. The shrub-dominated understory consists of falsebox, black huckleberry, Utah honeysuckle and Sitka alder, pinegrass, twinflower, queen's cup and bunchberry. The moss layer is poorly developed, but red-stemmed feathermoss occurs. The dominant soils are Dystric and Eutric Brunisols, Gray Luvisols and Humo-Ferric Podzols.

Dry Sites: Fd, Pl and frequently Lw form open, mature seral stands. The understory is dominated by pinegrass, with lesser amounts of kinnikinnick and falsebox. Lichens and red-stemmed feathermoss occur sporadically. Rocky south slopes have common juniper, shrubby penstemon and pinegrass.

Wet Sites: Mature climax sites are characterized by open stands of Sxw, Bl and Cw. The understory is dominated by the herbs, common horsetail, lady fern and oak fern. Black gooseberry and thimbleberry occur sporadically. The common mosses are the leafy mosses.

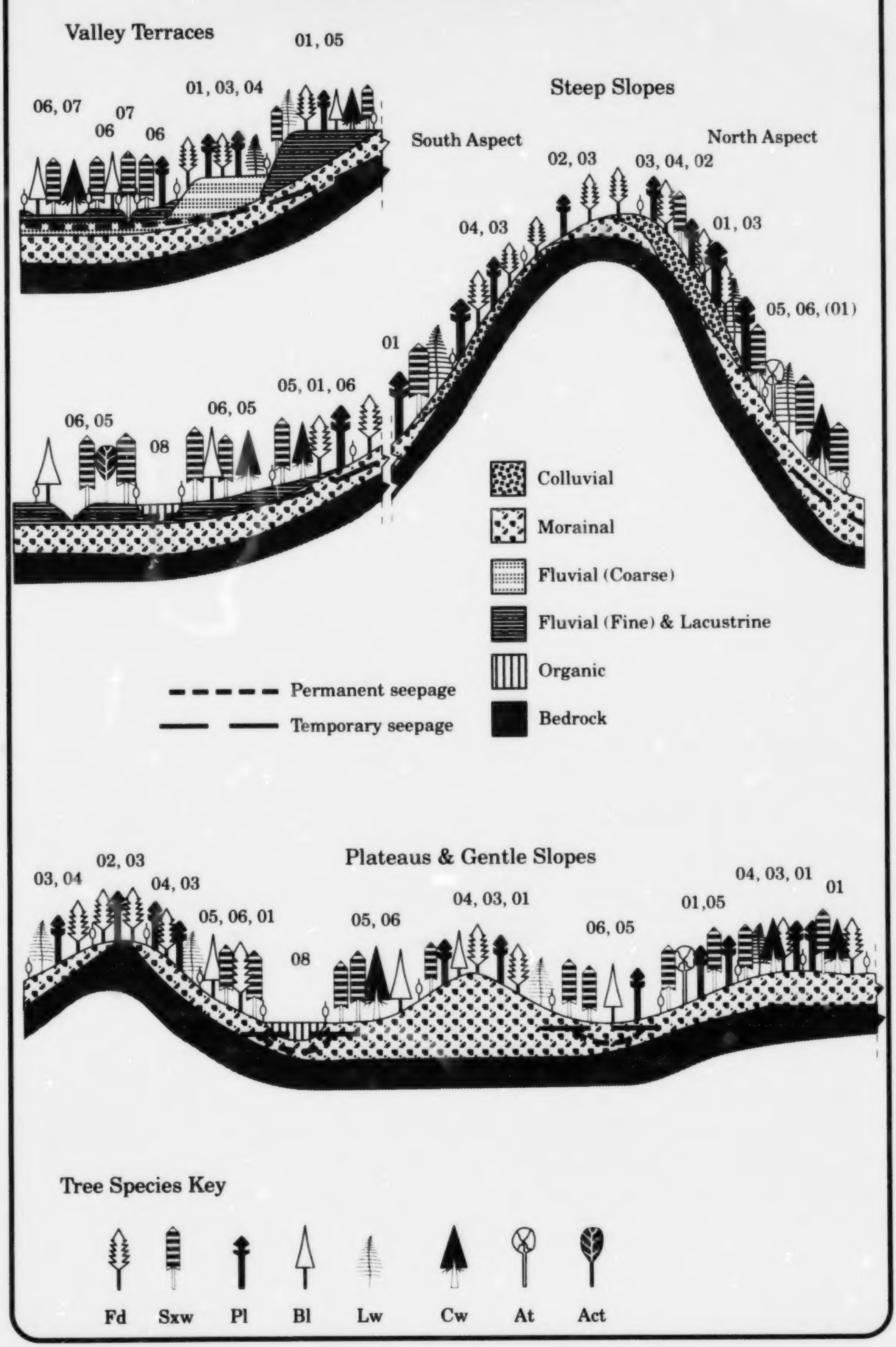
BGC Features: The ICH is distinguished from other zones by the presence of Cw. The absence of Hw distinguishes the ICHmk from other regional ICH subzones. The presence of Lw separates the ICHmk1 from the ICHmk2.

Comments: The areal extent of the ICHmk1 in the KFR is very limited. It is more widespread in the Nelson Forest Region in the southern Monashee Mountains and in the East Kootenays.



02	Fd — Juniper — Penstemon
03	FdPl — Pinegrass — Twinflower
04	FdPl — Sitka alder — Pinegrass
Zonal 01	CwSx — Falsebox
01-YS	CwSxw — Aspen
05	SxwFd — Gooseberry — Sarsaparilla
06	Sxw — Oak fern
07	Sxw — Horsetail
08	Sedge — Cinquefoil

ICH mk1



Valley Terraces
01, 05
06, 07
07
06
06
01, 03, 04
Steep Slopes
South Aspect
North Aspect
02, 03
03, 04, 02
04, 03
01, 03
05, 06, (01)
01
05, 01, 06
06, 05
06, 05
08
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 04
02, 03
04, 03
05, 06, 01
08
05, 06
04, 03, 01
06, 05
01,05
04, 03, 01
01
Tree Species Key
Fd
Sxw
Pl
Bl
Lw
Cw
At
Act

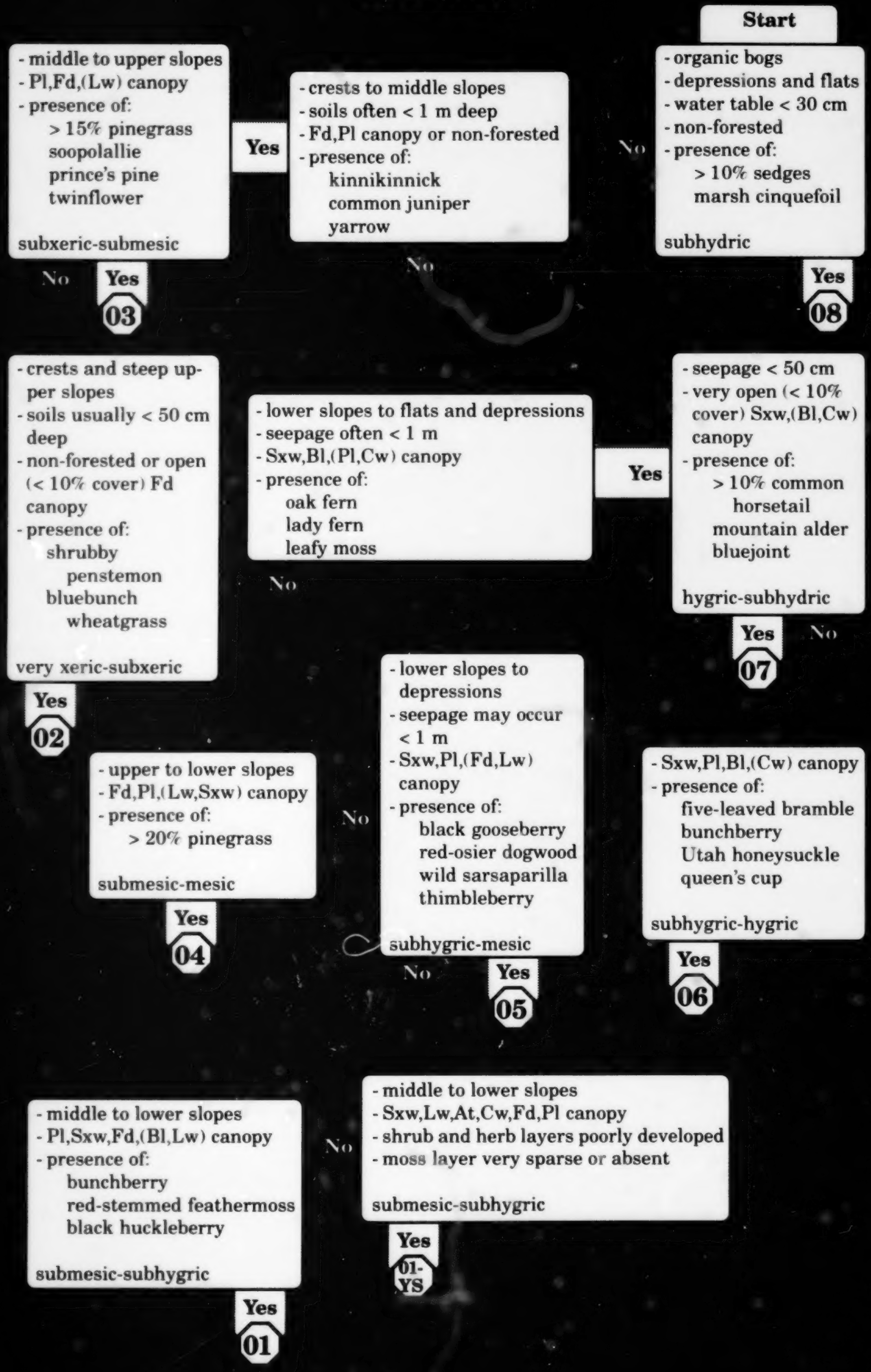
ICH mk1 Vegetation Table

	Site Units	02	03	04	01	01-YS	05	06	07	08	
Trees	*Pseudotsuga menziesii* var.*glauca*	■	■■	■■■	■	▮	■				interior Douglas-fir
	Larix occidentalis		▮	▮	▮	■■	■				western larch
	Pinus contorta		■■	■■	■■	▮	▮	▮			lodgepole pine
	Abies lasiocarpa			■	■■	■	▮	■■	▮		subalpine fir
	Picea engelmannii x *glauca*			▮	■■	■	■■■	■■■	▮		hybrid white spruce
	Thuja plicata			▮	■	■■■	■	■	▮		western redcedar
	Populus tremuloides					■	▮				trembling aspen
Shrubs	*Penstemon fruticosus*	▮									shrubby penstemon
	Juniperus communis	▮	▮								common juniper
	Amelanchier alnifolia	■	▮	▮							saskatoon
	Shepherdia canadensis		▮								soopolallie
	Paxistima myrsinites	■	■	■■	■■	▮	▮				falsebox
	Spiraea betulifolia	▮	▮	▮	▮		▮				birch-leaved spirea
	Lonicera utahensis		▮	▮	▮		▮	▮			Utah honeysuckle
	Vaccinium membranaceum		▮	▮	■		▮	▮			black huckleberry
	Alnus viridis			■	▮		▮	▮			Sitka alder
	Rubus parviflorus			▮	▮		■	▮			thimbleberry
	Ribes lacustre						▮	■	■■		black gooseberry
	Cornus sericea						▮				red-osier dogwood
	Alnus incana								■■		mountain alder
Herbs	*Agropyron spicatum*	▮									bluebunch wheatgrass
	Achillea millefolium	▮									yarrow
	Arctostaphylos uva-ursi	▮	■								kinnikinnick
	Calamagrostis rubescens	■■	■■■	■■■							pinegrass
	Chimaphila umbellata		▮	▮	▮						prince's pine
	Linnaea borealis		■	■	■		▮	▮			twinflower
	Cornus canadensis			▮	▮		▮	▮			bunchberry
	Clintonia uniflora			▮	▮	▮	▮	■			queen's cup
	Vaccinium scoparium			▮	▮						grouseberry
	Aralia nudicaulis						■				wild sarsaparilla
	Tiarella unifoliata						▮	▮	▮		one-leaved foamflower
	Rubus pedatus						▮	■			five-leaved bramble
	Gymnocarpium dryopteris							■■■	▮		oak fern
	Athyrium filix-femina							■	■		lady fern
	Equisetum spp.							▮	■■■		horsetails
	Calamagrostis canadensis								■		bluejoint
	Potentilla palustris									■	marsh cinquefoil
	Carex spp.									■■■	sedges
Mosses & Lichens	*Pleurozium schreberi*			▮	■■		▮	▮			red-stemmed feathermoss
	Mnium spp.							■	▮		leafy mosses

ICH mk1 Environment Table

Site Units	02	03	04	01	01-YS	05	06	07	08
				Zonal					
Soil Moisture Regime	VX-SX	SX-SM	SM-M	SM-SHG	SM-SHG	SHG-M	SHG-HG	HG-SHD	SHD
Prevailing Successional Stage Sampled	Young Climax	Maturing Seral			Young Seral	Young Climax	Maturing Climax		Young Climax
Aspect	All							N/A	
Slope Gradient & Mesoslope Position	Steep - gentle Crest & upper	Steep - gentle Upper - middle	Steep - gentle Upper - lower	Gentle Middle - lower		Gentle Lower,toe & depression		Flat Level & depression	
Soil Texture Class	Medium	Variable							Organic
Parent Materials	Cv, Mv	Mb, FGt	Mb	Mb, FGt, Fb		Fb, Mb		Fb	Ob
Important Soil Features	L15-100	Some L		-----		Some W	W 20-100	W 20-50	W 0-30

ICH mk1



- middle to upper slopes
- Pl,Fd,(Lw) canopy
- presence of:
  - > 15% pinegrass
  - soopolallie
  - prince's pine
  - twinflower

subxeric-submesic

- crests to middle slopes
- soils often < 1 m deep
- Fd,Pl canopy or non-forested
- presence of:
  - kinnikinnick
  - common juniper
  - yarrow

- organic bogs
- depressions and flats
- water table < 30 cm
- non-forested
- presence of:
  - > 10% sedges
  - marsh cinquefoil

subhydric

- crests and steep upper slopes
- soils usually < 50 cm deep
- non-forested or open (< 10% cover) Fd canopy
- presence of:
  - shrubby penstemon
  - bluebunch wheatgrass

very xeric-subxeric

- lower slopes to flats and depressions
- seepage often < 1 m
- Sxw,Bl,(Pl,Cw) canopy
- presence of:
  - oak fern
  - lady fern
  - leafy moss

- seepage < 50 cm
- very open (< 10% cover) Sxw,(Bl,Cw) canopy
- presence of:
  - > 10% common horsetail
  - mountain alder
  - bluejoint

hygric-subhydric

- upper to lower slopes
- Fd,Pl,(Lw,Sxw) canopy
- presence of:
  - > 20% pinegrass

submesic-mesic

- lower slopes to depressions
- seepage may occur < 1 m
- Sxw,Pl,(Fd,Lw) canopy
- presence of:
  - black gooseberry
  - red-osier dogwood
  - wild sarsaparilla
  - thimbleberry

subhygric-mesic

- Sxw,Pl,Bl,(Cw) canopy
- presence of:
  - five-leaved bramble
  - bunchberry
  - Utah honeysuckle
  - queen's cup

subhygric-hygric

- middle to lower slopes
- Pl,Sxw,Fd,(Bl,Lw) canopy
- presence of:
  - bunchberry
  - red-stemmed feathermoss
  - black huckleberry

submesic-subhygric

- middle to lower slopes
- Sxw,Lw,At,Cw,Fd,Pl canopy
- shrub and herb layers poorly developed
- moss layer very sparse or absent

submesic-subhygric

ICH mk2

THOMPSON MOIST COOL
INTERIOR CEDAR – HEMLOCK VARIANT

Distribution: The ICHmk2 has a limited distribution. It occupies mid-slopes on the east side of the North Thompson River from Barriere to Clearwater, encompassing Peterson and Mann creeks. At mid-elevations directly west of Barriere, the ICHmk2 occurs between Sinmax Creek and the Barriere River. It occurs above the IDFmw2 and below either the ICHmw2 or ESSFwc2.

Elevational Range (Mean): 975-1450 m

Climate: The climate of the ICHmk2 is transitional, between that of the ICH and the MS or SBS zones. The ICH is warmer than the MS and SBS, and receives more precipitation than the MS, SBS or IDF. The northern ICHmk2 variant is expected to be cooler, with a moister and shorter growing season, than the ICHmk1 variant.

Vegetation and Soils

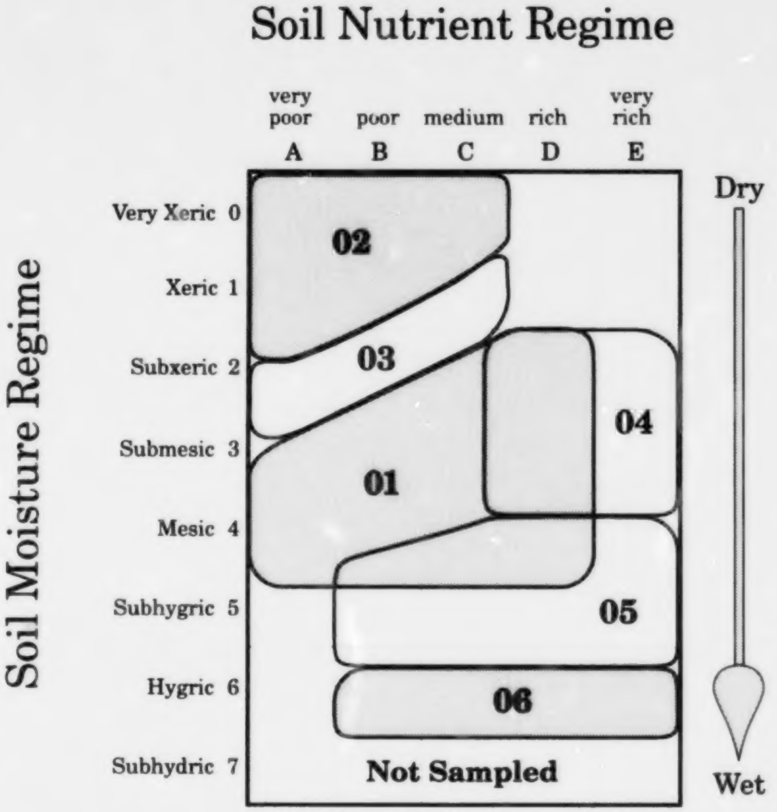
Zonal Sites: The forest canopy is composed of mature seral stands with Fd, Pl and the climax species Cw, Bl and Sxw. A moss-dominated, but otherwise sparse, understory contains falsebox, black huckleberry, twinflower, bunchberry and queen's cup. Red-stemmed feathermoss and knight's plume are the prevalent mosses. Soils are dominantly Humo-Ferric Podzols and Dystric Brunisols.

Dry Sites: On steep, southern exposures, Fd forms open, mature climax stands. A dense understory consists of common juniper, kinnikinnick and pinegrass. The bryophyte layer is poorly developed.

Wet Sites: Mature seral stands of Fd, Cw, Bl and Sxw characterize these sites. The open shrub layer is dominated by devil's club and black gooseberry. The rich herb layer is primarily composed of oak fern, with lesser amounts of bunchberry, queen's cup and one-leaved foamflower. Red-stemmed feathermoss and knight's plume occur in the moss layer.

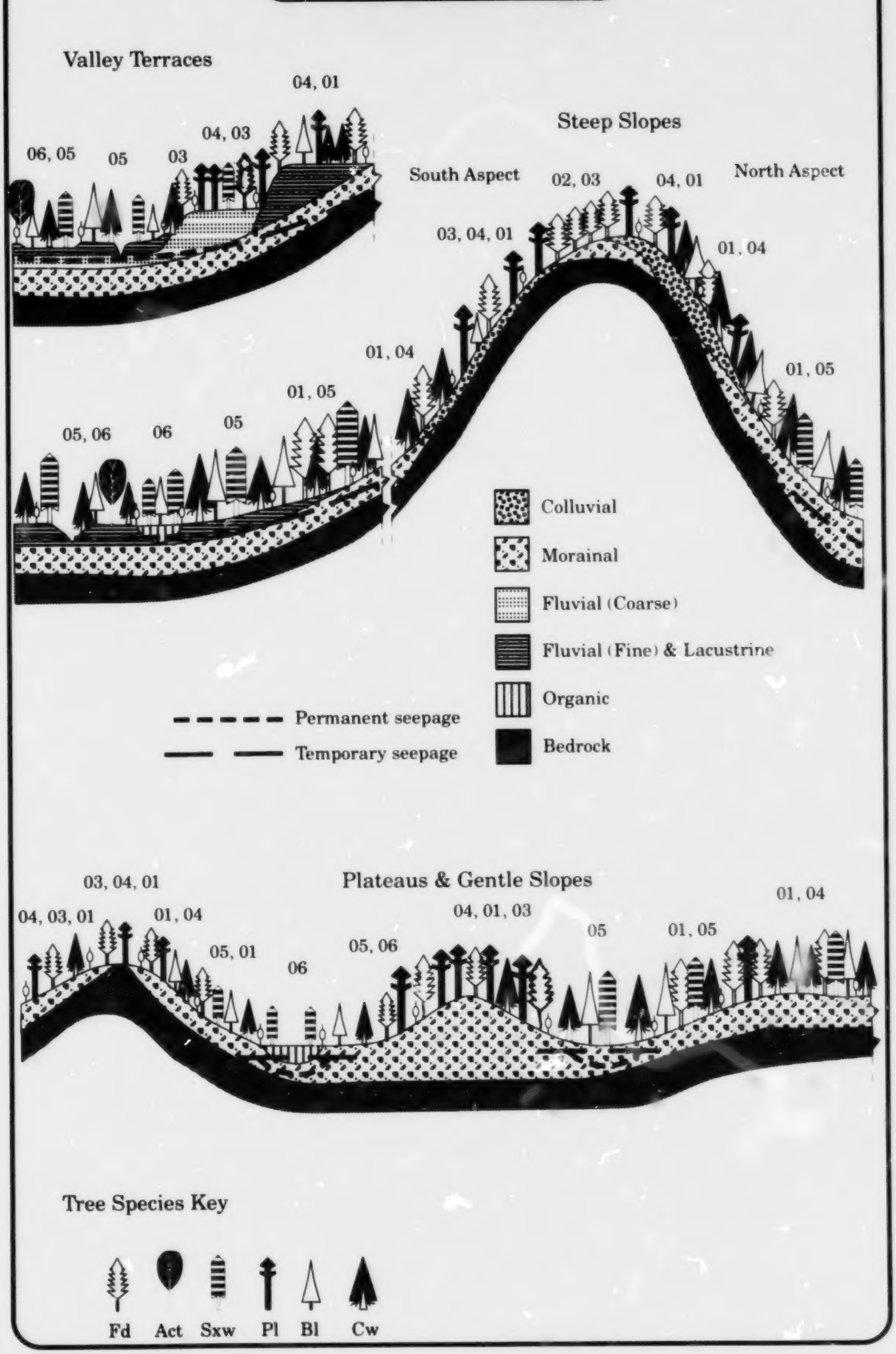
BGC Features: The ICH is distinguished from other zones by the presence of Cw. The dominance of Sxw and Bl separates the ICHmk2 from the IDFmw2. The absence of Hw distinguishes the ICHmk from other regional ICH subzones. The ICHmk2 lacks Lw, grouseberry and Utah honeysuckle; all are common in the ICHmk1.

Comments: The wettest ecosystems have not been sampled.



02	Fd — Juniper — Pinegrass
03	Fd — Falsebox — Pinegrass
04	CwSxw — Douglas maple — Fairybells
Zonal 01	CwSxw — Falsebox — Knight's plume
05	CwSxw — Oak fern — Bunchberry
06	Sxw — Horsetail

ICH mk2


Valley Terraces
06, 05
05
03
04, 03
04, 01
Steep Slopes
South Aspect
02, 03
04, 01
North Aspect
03, 04, 01
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Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 04, 01
04, 03, 01
01, 04
05, 01
06
05, 06
04, 01, 03
05
01, 05
01, 04
Tree Species Key
Fd
Act
Sxw
Pl
Bl
Cw

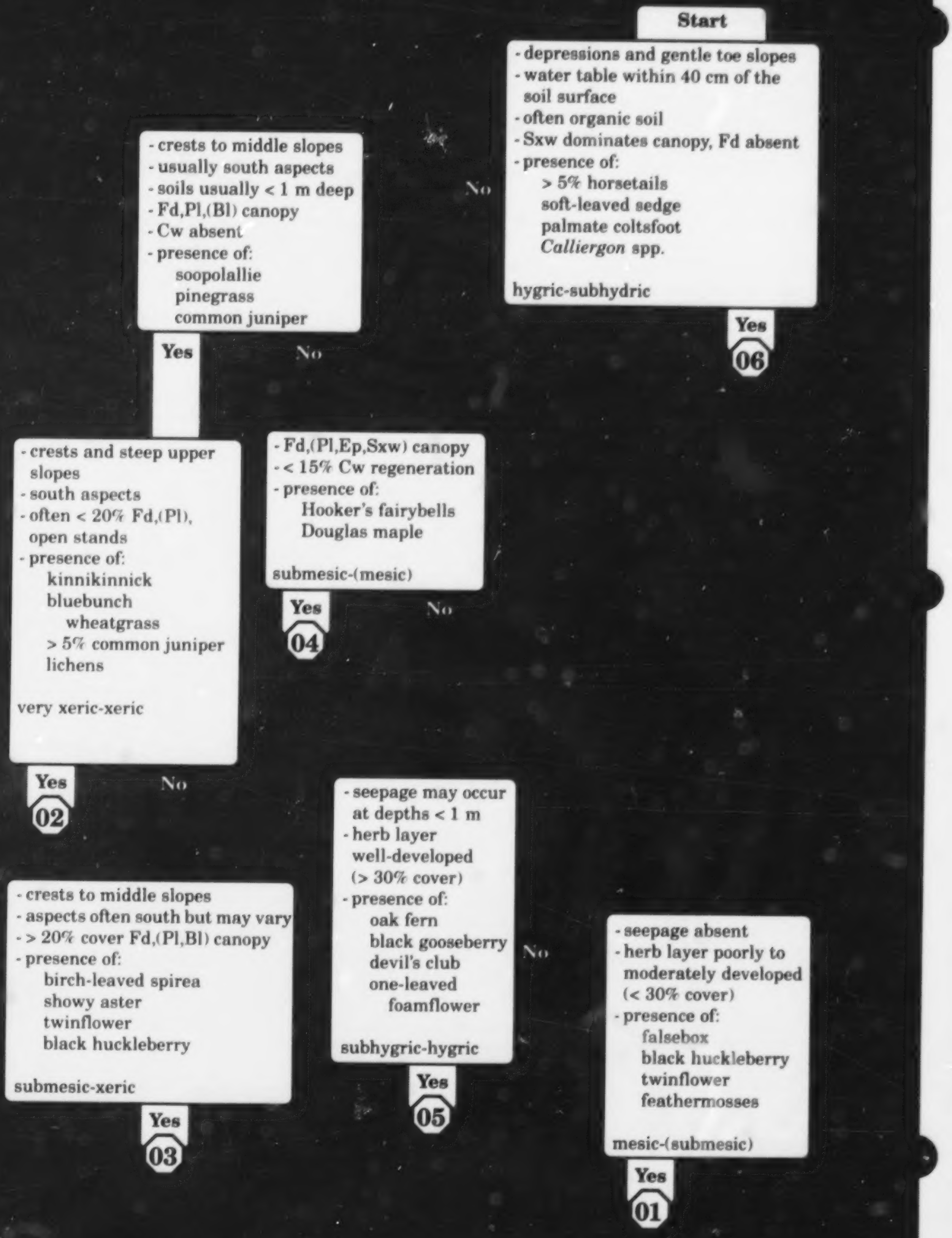
ICH mk2 Vegetation Table

	Site Units	02	03	04	01	05	06	
Trees	*Pinus contorta*	▏	██	█	██			lodgepole pine
	Pseudotsuga menziesii var. *glauca*	███	███	███	██	█		interior Douglas-fir
	Abies lasiocarpa		▏	▏	█	██	█	subalpine fir
	Betula papyrifera			▏	▏	▏		paper birch
	Thuja plicata			█	███	███	▏	western redcedar
	Picea engelmannii x glauca			▏	█	██	███	hybrid white spruce
Shrubs	*Juniperus communis*	███						common juniper
	Shepherdia canadensis	█	██					soopolallie
	Acer glabrum			█				Douglas maple
	Mahonia aquifolium		▏	▏				tall Oregon-grape
	Spiraea betulifolia		█	█				birch-leaved spirea
	Paxistima myrsinites	▏	██	██	██	▏		falsebox
	Vaccinium membranaceum		▏		▏	▏		black huckleberry
	Oplopanax horridus					█		devil's club
	Ribes lacustre					█	▏	black gooseberry
	Cornus sericea					▏	▏	red-osier dogwood
	Vaccinium ovalifolium						█	oval-leaved blueberry
Herbs	*Arctostaphylos uva-ursi*	███						kinnikinnick
	Agropyron spicatum	▏						bluebunch wheatgrass
	Calamagrostis rubescens	██	██					pinegrass
	Aster conspicuus		██	▏				showy aster
	Disporum hookeri			█				Hooker's fairybells
	Chimaphila umbellata		▏	█	▏			prince's pine
	Linnaea borealis		██	█	▏	▏		twinflower
	Cornus canadensis				▏	██	█	bunchberry
	Clintonia uniflora				▏	█		queen's cup
	Tiarella unifoliata					█		one-leaved foamflower
	Rubus pedatus				▏	█		five-leaved bramble
	Gymnocarpium dryopteris					██	█	oak fern
	Galium triflorum					▏	▏	sweet-scented bedstraw
	Mitella nuda						█	common mitrewort
	Petasites palmatus						█	palmate coltsfoot
	Carex disperma						█	soft-leaved sedge
	Equisetum arvense						██	common horsetail
Mosses & Lichens	*Peltigera rufescens*	█						lichen
	Cladonia spp.	▏						lichens
	Pleurozium schreberi	▏	██	█	██	██	██	red-stemmed feathermoss
	Ptilium crista-castrensis				██	█	▏	knight's plume
	Calliergon cordifolium						███	moss

ICH mk2 Environment Table

Site Units	02	03	04	01 **Zonal**	05	06
Soil Moisture Regime	VX-X	SM-X	SM-(M)	M-SM	SHG-HG	HG-SHD
Prevailing Successional Stage Sampled	Maturing Seral					Young Climax
Aspect	South		All		N/A	
Slope Gradient & Mesoslope Position	Steep Upper & crest	Steep - gentle Upp.-mid. & crest	Steep - gentle Middle	Gentle Middle & level	Gentle Mid.-low. & toe	Flat Level & depression
Soil Texture Class	Variable	Coarse		Variable	All	Organic
Parent Materials	Mv,Cv	Mv,(Cv)	Mb		Mb,Fb	Ob,Ov/Fb
Important Soil Features	L 10-35	L 30-110	--------		W 40-120	W 5-40

ICH mk2



- depressions and gentle toe slopes
- water table within 40 cm of the soil surface
- often organic soil
- Sxw dominates canopy, Fd absent
- presence of:
  - > 5% horsetails
  - soft-leaved sedge
  - palmate coltsfoot
  - *Calliergon* spp.

hygric-subhydric

- crests to middle slopes
- usually south aspects
- soils usually < 1 m deep
- Fd,Pl,(Bl) canopy
- Cw absent
- presence of:
  - soopolallie
  - pinegrass
  - common juniper

- crests and steep upper slopes
- south aspects
- often < 20% Fd,(Pl), open stands
- presence of:
  - kinnikinnick
  - bluebunch wheatgrass
  - > 5% common juniper
  - lichens

very xeric-xeric

- crests to middle slopes
- aspects often south but may vary
- > 20% cover Fd,(Pl,Bl) canopy
- presence of:
  - birch-leaved spirea
  - showy aster
  - twinflower
  - black huckleberry

submesic-xeric

- Fd,(Pl,Ep,Sxw) canopy
- < 15% Cw regeneration
- presence of:
  - Hooker's fairybells
  - Douglas maple

submesic-(mesic)

- seepage may occur at depths < 1 m
- herb layer well-developed (> 30% cover)
- presence of:
  - oak fern
  - black gooseberry
  - devil's club
  - one-leaved foamflower

subhygric-hygric

- seepage absent
- herb layer poorly to moderately developed (< 30% cover)
- presence of:
  - falsebox
  - black huckleberry
  - twinflower
  - feathermosses

mesic-(submesic)

ICH mw2

SHUSWAP MOIST WARM
INTERIOR CEDAR – HEMLOCK VARIANT

Distribution: The ICHmw2 occurs at low to mid-elevations from south of Shuswap Lake to the Shuswap River, encompassing Mara, Sugar and Mabel lakes. It occurs above the IDFmw and below either the ICHwk1 or ESSFwc2.

Elevational Range (Mean): 400-1450 m

Climate: The ICH is warmer than the MS and ESSF and wetter than the IDF and MS. The climate in the ICHmw is drier and warmer than both the ICHwk1 and ICHvk1. The ICHmw2 is slightly drier and warmer, with more growing degree days and a slightly longer frost-free period, than the ICHmw3.

Vegetation and Soils

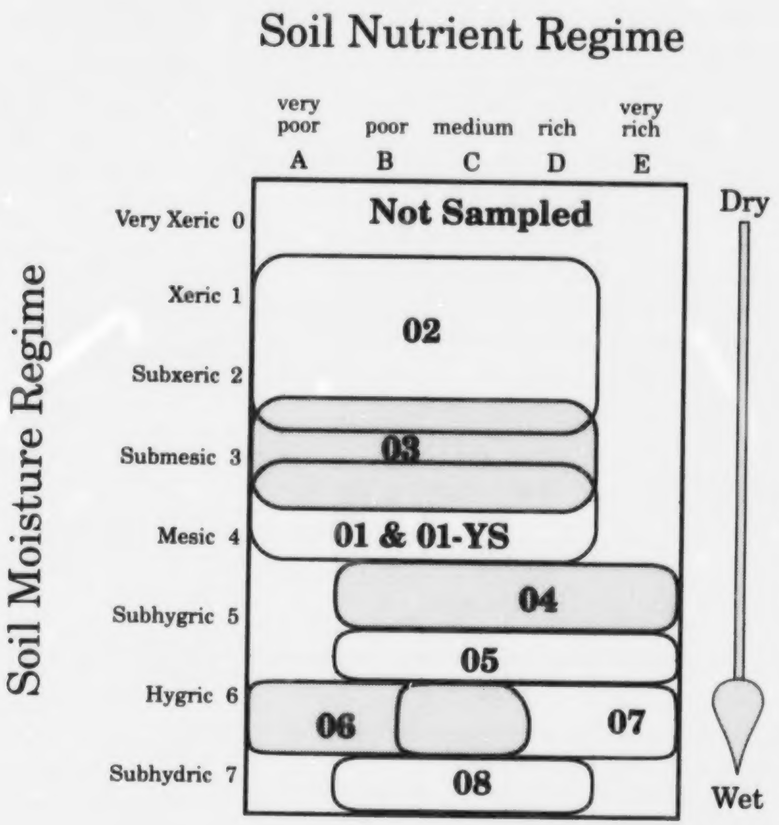
Zonal Sites: Cw and Hw form dense climax stands. Fd, Lw, Ep, Pw and Sxw are the seral trees. The mosses, red-stemmed feathermoss, step moss and pipecleaner moss dominate the understory, with a low cover of falsebox, prince's pine and twinflower. The dominant soils are Humo-Ferric Podzols and Dystric Brunisols.

Dry Sites: Open climax stands are dominated by Fd and Cw, with lesser amounts of the seral species Lw, Pw and Ep. The shrub-herb dominated understory consists of falsebox, birch-leaved spirea, soopolallie, pinegrass and twinflower. Red-stemmed feathermoss is the dominant moss.

Wet Sites: These sites are characterized by dense stands of Cw and Hw. These shrub-herb dominated communities are composed of devil's club, one-leaved foamflower, bunchberry, wild sarsaparilla and step moss. On wetter sites, devil's club, skunk cabbage and lady fern are abundant. In collecting sites, buckbean, bluejoint, tufted clubrush and glow moss dominate.

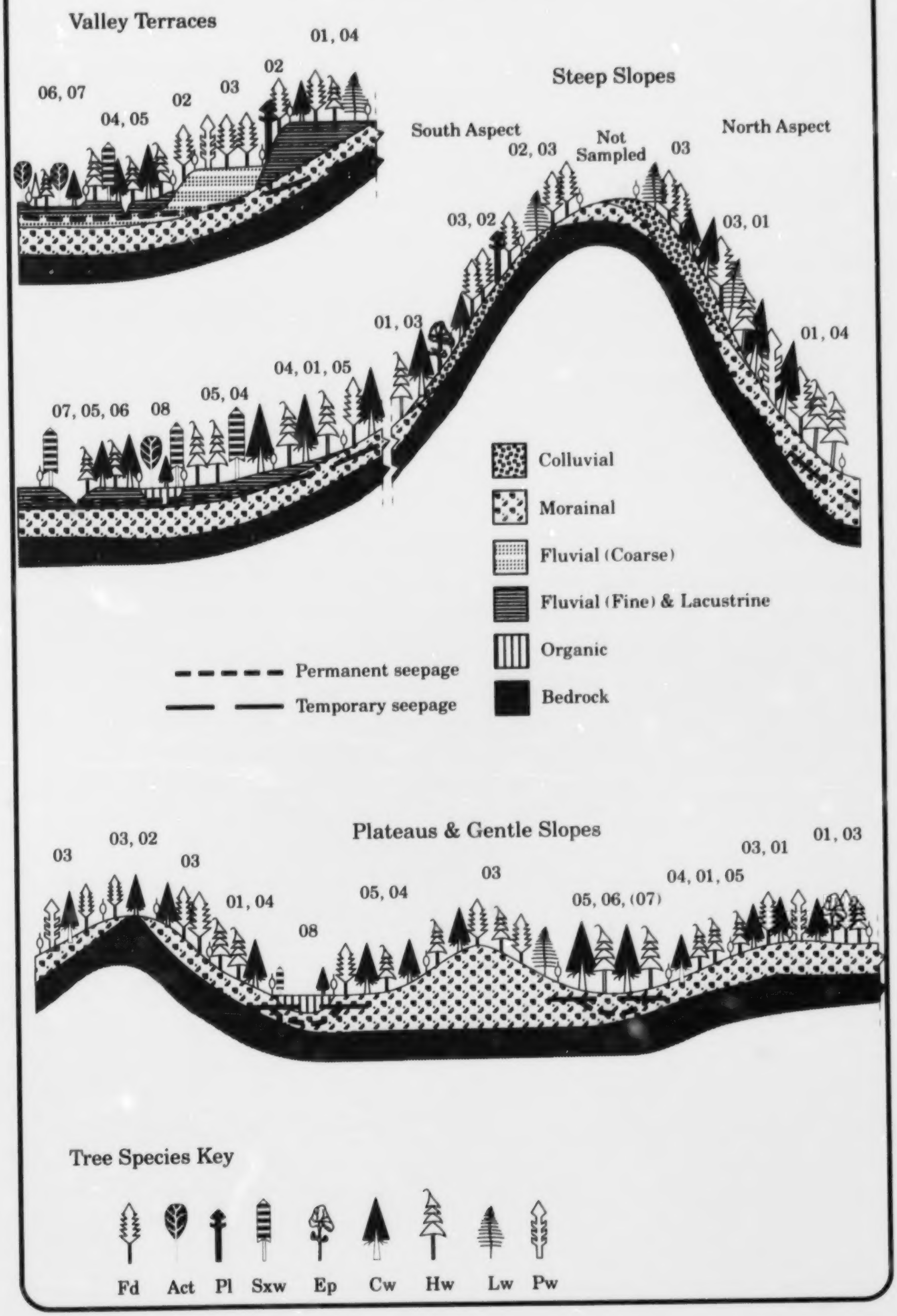
BGC Features: The occurrence of Cw and/or Hw distinguishes the ICH from other interior zones. The presence of Lw, and the absence of an oak fern dominated herb layer on zonal sites, separates the ICHmw2 from the ICHmw3 and ICHwk1, respectively. The ICHmk lacks Hw, which commonly occurs in the ICHmw2.

Comments: The driest sites in this variant have not been sampled.



02	FdCw — Falsebox — Prince's pine
03	CwFd — Falsebox
Zonal 01	HwCw — Falsebox — Feathermoss
01-YS	CwFd — Feathermoss
04	CwHw — Oak fern — Foamflower
05	CwHw — Devil's club — Sarsaparilla
06	CwHw — Horsetail
07	CwSxw — Skunk cabbage
08	Bluejoint — Glow moss

ICH mw2


Valley Terraces
06, 07
04, 05
02
03
02
01, 04
Steep Slopes
South Aspect
02, 03
Not Sampled
03
North Aspect
03, 02
03, 01
01, 03
01, 04
04, 01, 05
05, 04
08
07, 05, 06
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03
03, 02
03
01, 04
08
05, 04
03
05, 06, (07)
04, 01, 05
03, 01
01, 03
Tree Species Key
Fd
Act
Pl
Sxw
Ep
Cw
Hw
Lw
Pw

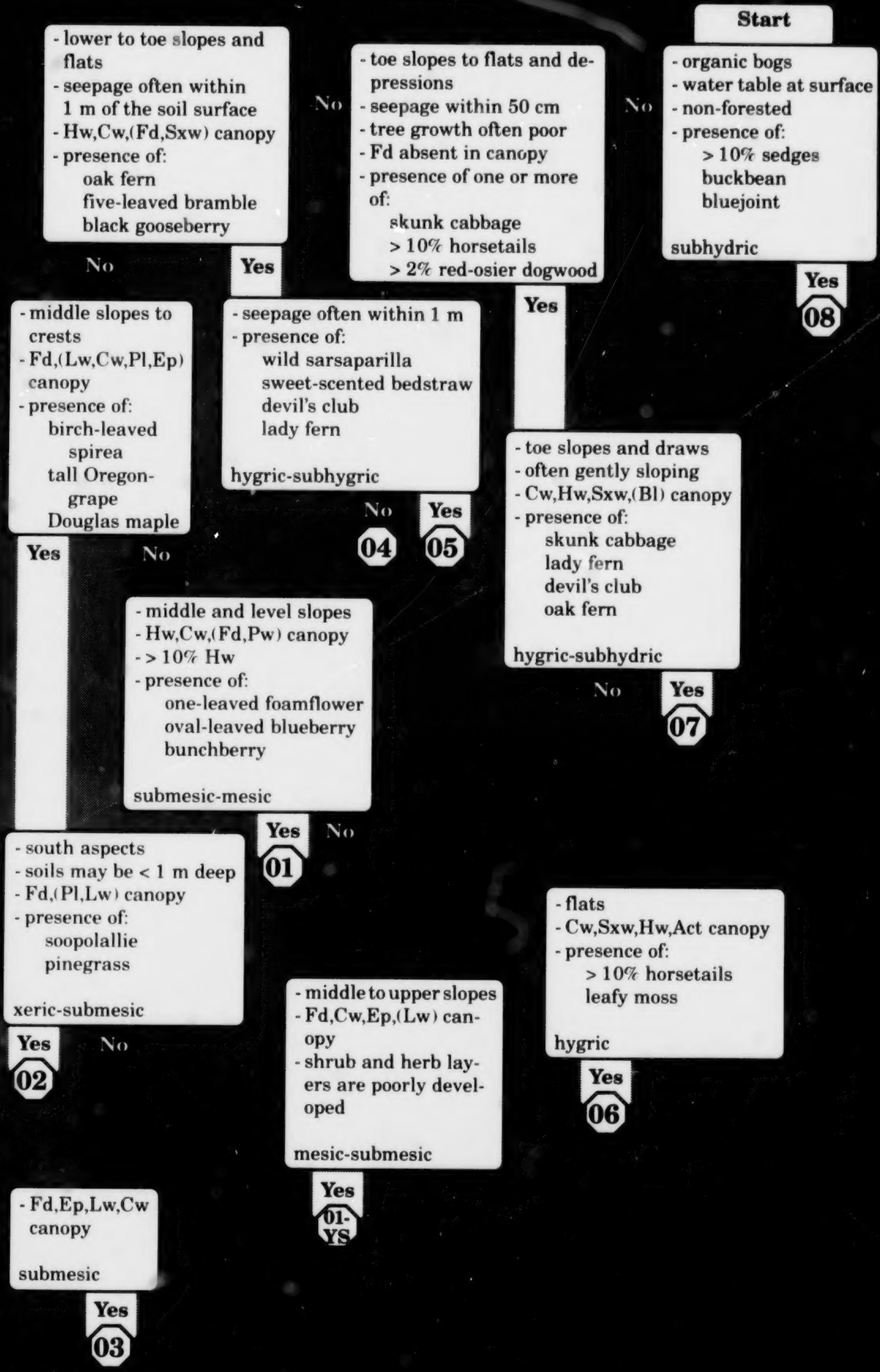
ICH mw2 Vegetation Table

	Site Units	02	03	01-YS	01	04	05	06	07	08	
Trees	*Larix occidentalis*	▪	■	▪							western larch
	Betula papyrifera		■	▪							paper birch
	Pseudotsuga menziesii var.glauca	▬	▬	▬	■	▪	▪				interior Douglas-fir
	Thuja plicata	■	▬	▬	▬	▬	▬	■	▬	▪	western redcedar
	Tsuga heterophylla		▪	▪	▬	▬	▬	■	▬		western hemlock
	Picea engelmannii x glauca						▪	■	▪	▪	hybrid white spruce
Shrubs	*Shepherdia canadensis*	■									soopollalie
	Spiraea betulifolia	■	▪								birch-leaved spirea
	Mahonia aquifolium	▪	▪								tall Oregon-grape
	Acer glabrum	▪	▪								Douglas maple
	Paxistima myrsinites	■	■	▪	■	▪	▪				falsebox
	Vaccinium membranaceum				▪	▪	▪	▪	▪		black huckleberry
	Vaccinium ovalifolium						▪	▪	▪		oval-leaved blueberry
	Oplopanax horridus						▪		■		devil's club
	Ribes lacustre						▪	▪	▪		black gooseberry
	Cornus sericea						▪	■	▪		red-osier dogwood
	Alnus incana									■	mountain alder
Herbs	*Calamagrostis rubescens*	■									pinegrass
	Chimaphila umbellata	■	▪		▪		▪				prince's pine
	Linnaea borealis	■	■		▪	▪	▪	▪	▪		twinflower
	Clintonia uniflora				▪	▪	■		▪		queen's cup
	Tiarella unifoliata				▪	■	■	▪	■		one-leaved foamflower
	Cornus canadensis				▪	■	■	▪	■	▪	bunchberry
	Rubus pedatus					▪	▪				five-leaved bramble
	Gymnocarpium dryopteris					▬	▪		▪		oak fern
	Streptopus roseus						▪				rosy twistedstalk
	Aralia nudicaulis						■		▪		wild sarsaparilla
	Galium triflorum						▪	▪	▪		sweet-scented bedstraw
	Equisetum scirpoides							■			dwarf scouring-rush
	Equisetum arvense							■			common horsetail
	Lysichiton americanum								▬		skunk cabbage
	Athyrium filix-femina								■		lady fern
	Carex rostrata									■	beaked sedge
	Trichophorum cespitosum									■	tufted clubrush
	Calamagrostis canadensis									■	bluejoint
	Menyanthes trifoliata									■	buckbean
Mosses	*Pleurozium schreberi*	■	■	▪	■	■	■	■			red-stemmed feathermoss
	Hylocomium splendens		▪		■	▪	■		▪		step moss
	Rhytidiopsis robusta				■	■	▪				pipecleaner moss
	Mnium spp.							■	▪		leafy mosses
	Aulacomnium palustre									■	glow moss

ICH mw2 Environment Table

Site Units	02	03	01-YS	01	04	05	06	07	08
				Zonal					
Soil Moisture Regime	X-SM	SM	SM-M	M-SM	SHG-M	SHG-HG	HG-SHG	HG-SHD	SHD
Prevailing Successional Stage Sampled	Maturing Climax	Maturing Seral	Young Seral	Maturing Climax			Young Climax	Maturing Climax	Young Climax
Aspect	South	All					N/A		
Slope Gradient & Mesoslope Position	Steep - gentle Middle - upper	Steep - gentle Middle - upper		Gentle - (steep) Middle - lower	Gentle Lower - level	Gentle Low.,toe & depres.	Flat Level & depression		Flat Depression
Soil Texture Class	Variable			Medium		Variable	Fine	Variable	Organic
Parent Materials	Mb, Cv/Mb	Mb, (Fb)	Mb	Mb, (Cb)	Mb, (Fb)	Fb,Mb	Ov/Mb-Fb	Ov/Fb,Fb	Ob
Important Soil Features	--------				Minor W	W 50-100	W 10-50	W 10-40	W 0-15

ICH mw2



Start

- organic bogs
- water table at surface
- non-forested
- presence of:
  - > 10% sedges
  - buckbean
  - bluejoint

subhydric

Yes **08**

No

- toe slopes to flats and depressions
- seepage within 50 cm
- tree growth often poor
- Fd absent in canopy
- presence of one or more of:
  - skunk cabbage
  - > 10% horsetails
  - > 2% red-osier dogwood

Yes

- toe slopes and draws
- often gently sloping
- Cw,Hw,Sxw,(Bl) canopy
- presence of:
  - skunk cabbage
  - lady fern
  - devil's club
  - oak fern

hygric-subhydric

No | Yes **07**

- flats
- Cw,Sxw,Hw,Act canopy
- presence of:
  - > 10% horsetails
  - leafy moss

hygric

Yes **06**

No

- lower to toe slopes and flats
- seepage often within 1 m of the soil surface
- Hw,Cw,(Fd,Sxw) canopy
- presence of:
  - oak fern
  - five-leaved bramble
  - black gooseberry

No | Yes

- seepage often within 1 m
- presence of:
  - wild sarsaparilla
  - sweet-scented bedstraw
  - devil's club
  - lady fern

hygric-subhygric

No **04** | Yes **05**

- middle slopes to crests
- Fd,(Lw,Cw,Pl,Ep) canopy
- presence of:
  - birch-leaved spirea
  - tall Oregon-grape
  - Douglas maple

Yes | No

- middle and level slopes
- Hw,Cw,(Fd,Pw) canopy
- > 10% Hw
- presence of:
  - one-leaved foamflower
  - oval-leaved blueberry
  - bunchberry

submesic-mesic

Yes **01** | No

- middle to upper slopes
- Fd,Cw,Ep,(Lw) canopy
- shrub and herb layers are poorly developed

mesic-submesic

Yes **01-YS**

- south aspects
- soils may be < 1 m deep
- Fd,(Pl,Lw) canopy
- presence of:
  - soopolallie
  - pinegrass

xeric-submesic

Yes **02** | No

- Fd,Ep,Lw,Cw canopy

submesic

Yes **03**

THOMPSON MOIST WARM
INTERIOR CEDAR – HEMLOCK VARIANT

Distribution: This variant occurs in the Shuswap and Quesnel highlands. It occupies valley bottoms and mid-slopes of the Eagle, Seymour, Barriere, Adams, North Thompson, Clearwater, and Raft river drainages. It occurs above the IDFmw2 and below either the ICHwk1 or ESSFwc2.

Elevational Range (Mean): 400-1400 m

Climate: The ICH is warmer than the MS and ESSF, and wetter than the MS and IDF. The ICHmw3 is drier,warmer and has more growing degree days than ICHwk1 and ICHvk1. It is moister and cooler than the ICHmw2, and has considerably fewer growing degree days and a slightly shorter frost-free period.

Vegetation and Soils

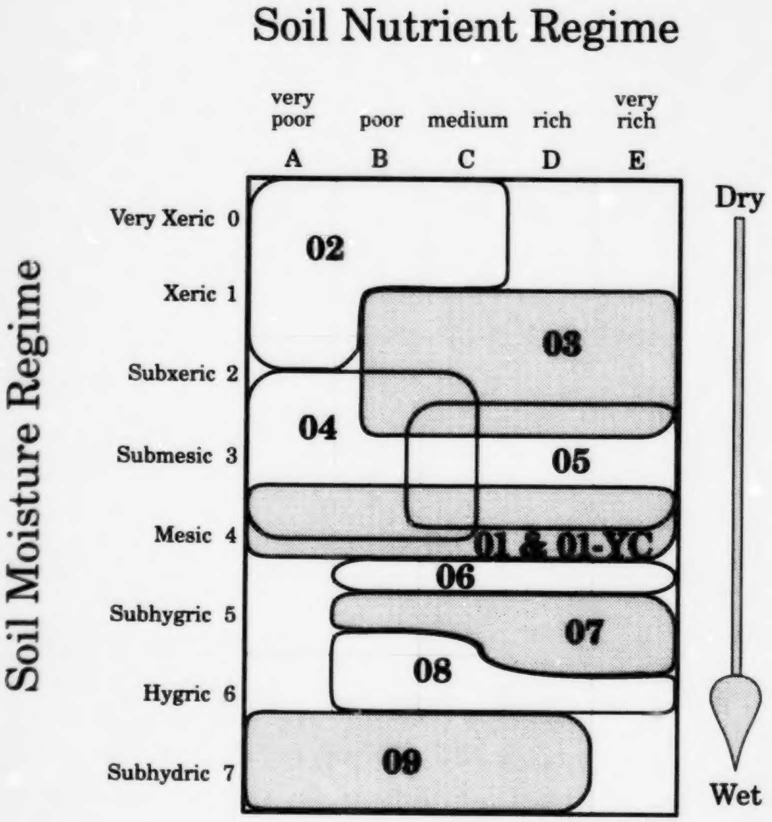
Zonal Sites: Dense mature climax stands are composed of Cw and Hw. The seral species are Fd, Pl and Ep. As a result of the dense forest canopy, the shrub and herb layers are sparse. Falsebox, prince's pine, twinflower and queen's cup are generally present. Red-stemmed feathermoss and step moss form a carpet-like moss layer. Humo-Ferric Podzols are the common soils.

Dry Sites: Mature seral stands are composed of Pl and varying amounts of Pw and Ep. The understory is dominated by pinegrass; birch-leaved spirea commonly occurs. The dominant moss is red-stemmed feathermoss. On the drier, steep south-facing slopes, common juniper, kinnikinnick and lichens occur.

Wet Sites: These sites are characterized by dense climax stands of Cw and Hw with minor amounts of Sxw and Bl. They have an open shrub layer of devil's club and a moderately dense herb layer dominated by lady fern, oak fern, one-leaved foamflower and bunchberry. Step moss is the prevalent moss. The wettest sites are dominated by skunk cabbage or sedges and sphagnums and have a very open, stunted tree canopy.

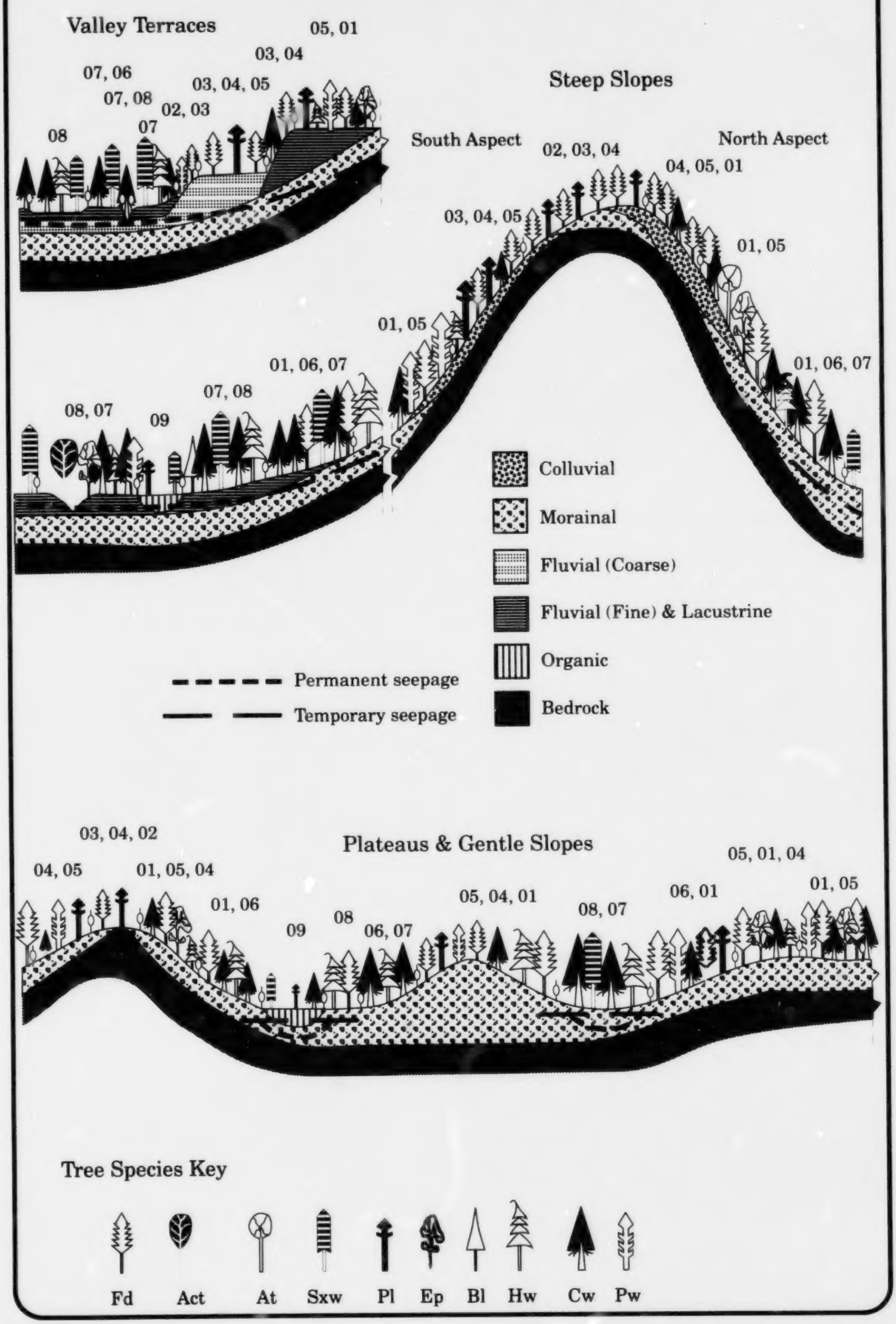
BGC Features: The ICH is distinguished from other interior zones by the presence of Cw, and generally the occurrence of Hw. The presence of Lw in the ICHmw2, an oak fern dominated herb layer in the ICHwk1, and the lack of Hw in the ICHmk separates these units from the ICHmw3.

Comments: In future, the ICHmw3 may be divided into two variants based on successional and elevational differences. The ICHmw1 occurs in the Nelson Forest Region.



02	Fd — Juniper — Cladina
03	Fd — Pinegrass — Feathermoss
04	CwFd — Soopolallie — Twinflower
05	CwFd — Falsebox
Zonal 01	HwCw — Falsebox — Feathermoss
01-YC	HwCw — Feathermoss
06	CwHw — Oak fern
07	CwHw — Devil's club — Lady fern
08	CwSxw — Skunk cabbage
09	Sedge — Sphagnum

ICH mw3


Valley Terraces
05, 01
03, 04
07, 06
03, 04, 05
07, 08
02, 03
07
08
Steep Slopes
South Aspect
02, 03, 04
North Aspect
04, 05, 01
03, 04, 05
01, 05
01, 05
01, 06, 07
01, 06, 07
07, 08
08, 07
09
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
03, 04, 02
Plateaus & Gentle Slopes
04, 05
01, 05, 04
05, 01, 04
01, 06
05, 04, 01
06, 01
01, 05
08
09
06, 07
08, 07
Tree Species Key
Fd
Act
At
Sxw
Pl
Ep
Bl
Hw
Cw
Pw

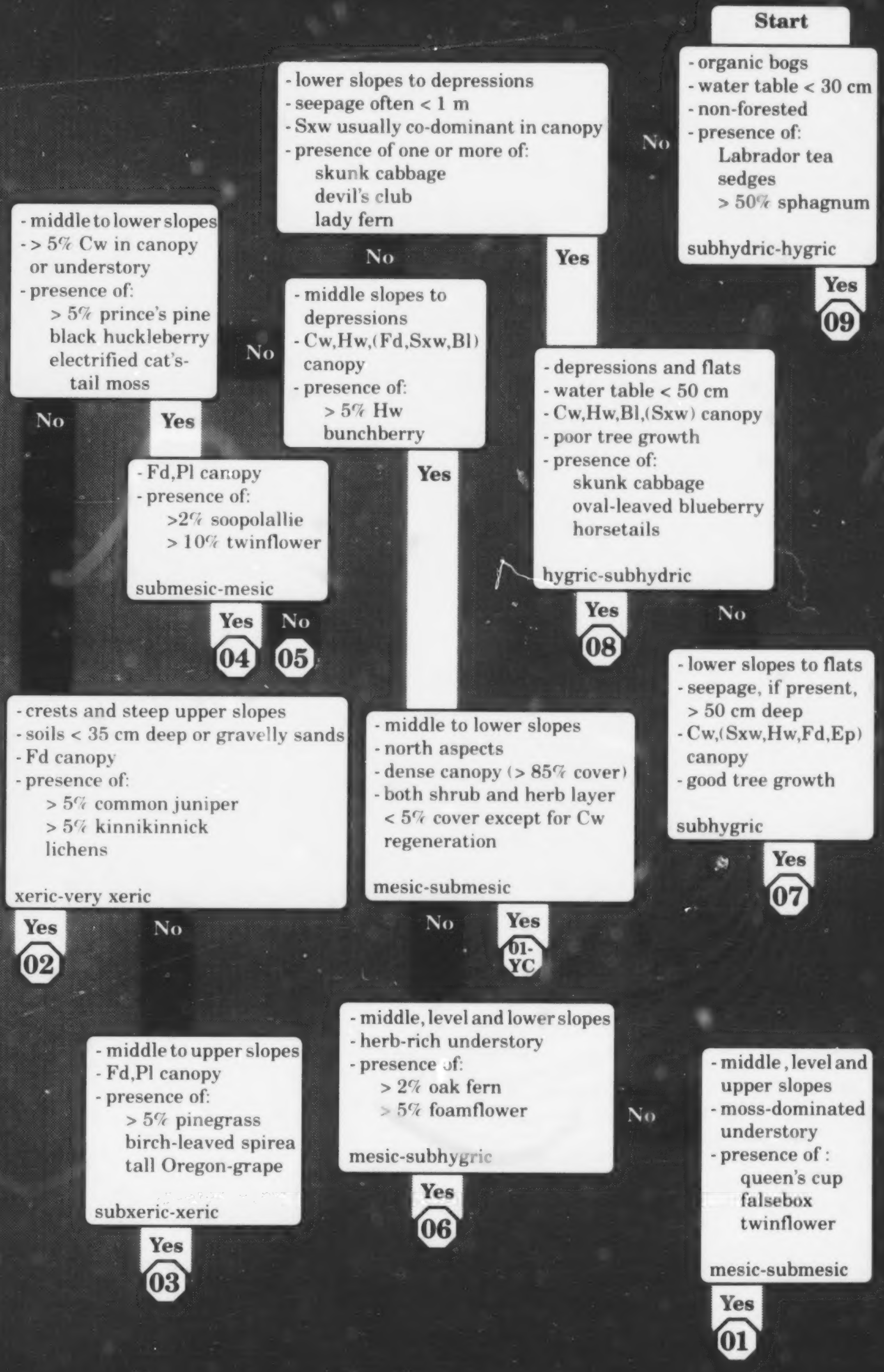
ICH mw3 Vegetation Table

	Site Units	02	03	04	05	01	01-YC	06	07	08	09	
Trees	*Pseudotsuga menziesii* var.*glauca*	■■■	■■■	■■■	■■■	■	■■■		▮			interior Douglas-fir
	Thuja plicata	▮		■■	■■■	■■■	■■■	■■■	■■■	■■■		western redcedar
	Pinus contorta		■■	■■■							■	lodgepole pine
	Betula papyrifera			▮	■		▮		▮	▮		paper birch
	Tsuga heterophylla					■■■	■■	■■■	■■	■■■		western hemlock
	Picea engelmannii x glauca							▮	▮	■	▮	hybrid white spruce
	Abies lasiocarpa									■		subalpine fir
Shrubs	*Juniperus communis*	■■										common juniper
	Shepherdia canadensis		▮	■■								soopolallie
	Mahonia aquifolium		▮	▮								tall Oregon-grape
	Spiraea betulifolia		■	■	▮							birch-leaved spirea
	Paxistima myrsinites		▮	■■	■■■	■		▮	▮			falsebox
	Vaccinium membranaceum			▮	▮	▮		▮		▮		black huckleberry
	Vaccinium ovalifolium							▮		■■		oval-leaved blueberry
	Ribes lacustre								▮			black gooseberry
	Oplopanax horridus								■■	■		devil's club
Herbs	*Arctostaphylos uva-ursi*	■■	▮									kinnikinnick
	Calamagrostis rubescens		■■■									pinegrass
	Linnaea borealis		▮	■■■	▮	▮		▮		▮		twinflower
	Chimaphila umbellata			■■	■	▮	▮					prince's pine
	Clintonia uniflora					▮		■	▮			queen's cup
	Cornus canadensis					▮		■	■	■		bunchberry
	Gymnocarpium dryopteris							■	■■	▮		oak fern
	Tiarella unifoliata							■	■■	■		one-leaved foamflower
	Athyrium filix-femina								■	■■		lady fern
	Equisetum arvense									▮		common horsetail
	Streptopus roseus							▮		■		rosy twistedstalk
	Lysichiton americanum									■■■		skunk cabbage
	Carex spp.										■■■	sedges
	Calamagrostis canadensis										▮	bluejoint
	Rubus arcticus										▮	dwarf nagoonberry
Mosses & Lichens	*Cladina* spp.	■										lichens
	Ptilium crista-castrensis					▮	▮	■				knight's plume
	Pleurozium schreberi	■■	■■	■■	▮	■■■	■	■■■	▮	▮		red-stemmed feathermoss
	Rhytidiadelphus triquetrus			▮	▮	▮	▮		▮	▮		electrified cat's-tail moss
	Hylocomium splendens				▮	■■■	▮	■■■	■	■■		step moss
	Mnium spp.								▮	■■		leafy mosses
	Sphagnum spp.									▮	■■■	sphagnums

ICH mw3 Environment Table

Site Units	02	03	04	05	01 **Zonal**	01-YC	06	07	08	09
Soil Moisture Regime	X-VX	SX-X	SM-(M)	SM-M	M-SM	M-SM	M-SHG	SHG	HG-SHD	SHD-HG
Prevailing Successional Stage Sampled	Maturing Climax	Maturing Seral			Yng.&Ma. Climax	Young Climax	Maturing Climax	Yng.&Ma. Climax	Young Climax	Young Climax
Aspect	South			All		North	All		Flat	
Slope Gradient & Mesoslope Position	Steep Upper & crest	Steep Middle - upper	Gentle Middle - upper	Steep - gentle Middle	Gentle Middle & level	Gentle Middle - lower	Gentle Mid.-low. & level	Gentle & flat Toe & level	Flat - gentle Level & depression	
Soil Texture Class	Variable	Coarse		Variable	Medium	All				Organic
Parent Materials	Mv,Ov	Mb,(Cv,FGt)	Mb,FGt		Mb,(Fb)		Mb	Fb,(Mb)	Fb	Ob
Important Soil Features	L 10-35	Some L	--------					W 80-120	W 15-50	W 2-30

ICH mw3



Start

- organic bogs
- water table < 30 cm
- non-forested
- presence of:
  - Labrador tea
  - sedges
  - > 50% sphagnum

subhydric-hygric

- lower slopes to depressions
- seepage often < 1 m
- Sxw usually co-dominant in canopy
- presence of one or more of:
  - skunk cabbage
  - devil's club
  - lady fern

- depressions and flats
- water table < 50 cm
- Cw,Hw,Bl,(Sxw) canopy
- poor tree growth
- presence of:
  - skunk cabbage
  - oval-leaved blueberry
  - horsetails

hygric-subhydric

- lower slopes to flats
- seepage, if present, > 50 cm deep
- Cw,(Sxw,Hw,Fd,Ep) canopy
- good tree growth

subhygric

- middle slopes to depressions
- Cw,Hw,(Fd,Sxw,Bl) canopy
- presence of:
  - > 5% Hw
  - bunchberry

- middle to lower slopes
- north aspects
- dense canopy (> 85% cover)
- both shrub and herb layer < 5% cover except for Cw regeneration

mesic-submesic

- middle to lower slopes
- > 5% Cw in canopy or understory
- presence of:
  - > 5% prince's pine
  - black huckleberry
  - electrified cat's-tail moss

- Fd,Pl canopy
- presence of:
  - >2% soopolallie
  - > 10% twinflower

submesic-mesic

- crests and steep upper slopes
- soils < 35 cm deep or gravelly sands
- Fd canopy
- presence of:
  - > 5% common juniper
  - > 5% kinnikinnick
  - lichens

xeric-very xeric

- middle to upper slopes
- Fd,Pl canopy
- presence of:
  - > 5% pinegrass
  - birch-leaved spirea
  - tall Oregon-grape

subxeric-xeric

- middle, level and lower slopes
- herb-rich understory
- presence of:
  - > 2% oak fern
  - > 5% foamflower

mesic-subhygric

- middle, level and upper slopes
- moss-dominated understory
- presence of :
  - queen's cup
  - falsebox
  - twinflower

mesic-submesic

ICH vk1

MICA VERY WET COOL
INTERIOR CEDAR – HEMLOCK VARIANT

Distribution: The ICHvk1 variant extends upstream from the ICHwk1 in the valley bottoms and sidewalls of the Hobson, Azure, Murtle and upper North Thompson river drainages, and their tributaries. It is also located on the west side of the Monashee Mountains, and in the Upper Adams, Seymour, Perry and Upper Shuswap rivers, and their tributaries. It occurs above the ICHwk1 and below either the ESSFwc2 or ESSFvc.

Elevational Range (Mean): 900-1280 m

Climate: The ICH is warmer than the MS and ESSF, and wetter than the IDF and MS. The ICHvk is the wettest and coolest ICH subzone in the KFR. It has substantial snow accumulations and a moisture surplus is common during the growing season.

Vegetation and Soils

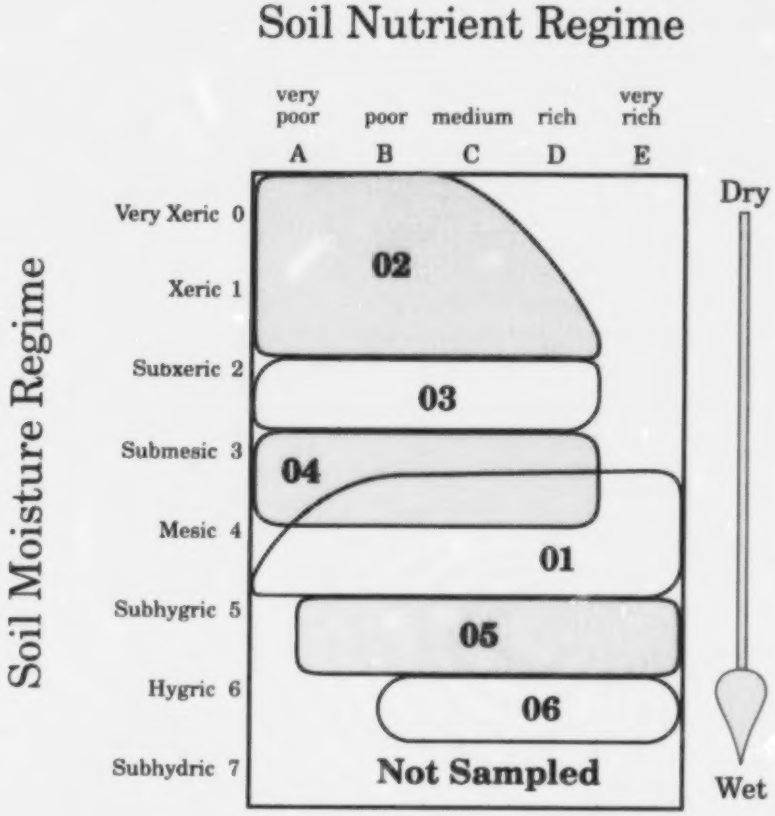
Zonal Sites: Mature climax stands are dominated by Cw and Hw. Devil's club is abundant in the shrubby understory. In the diverse but fern-rich herb layer, oak, spiny wood and lady ferns and one-leaved foamflower are dominant. The moss layer is sparse and poorly represented. The common soils are Humo-Ferric and Ferro-Humic Podzols.

Dry Sites: Mature climax stands of Cw and Hw occur with the seral species Fd and Sxw. The understory is moss-dominated, although falsebox frequently occurs with queen's cup and one-leaved foamflower. Red-stemmed feathermoss and pipecleaner moss form a continuous cover.

Wet Sites: Open successional stands of Sxw, Cw and Act characterize the floodplains. The shrubby understory has black twinberry, red-osier dogwood, common horsetail and lady fern. *Mnium nudum* is the common moss. On collecting sites, lady fern, skunk cabbage, *Mnium punctatum* and sphagnums are abundant.

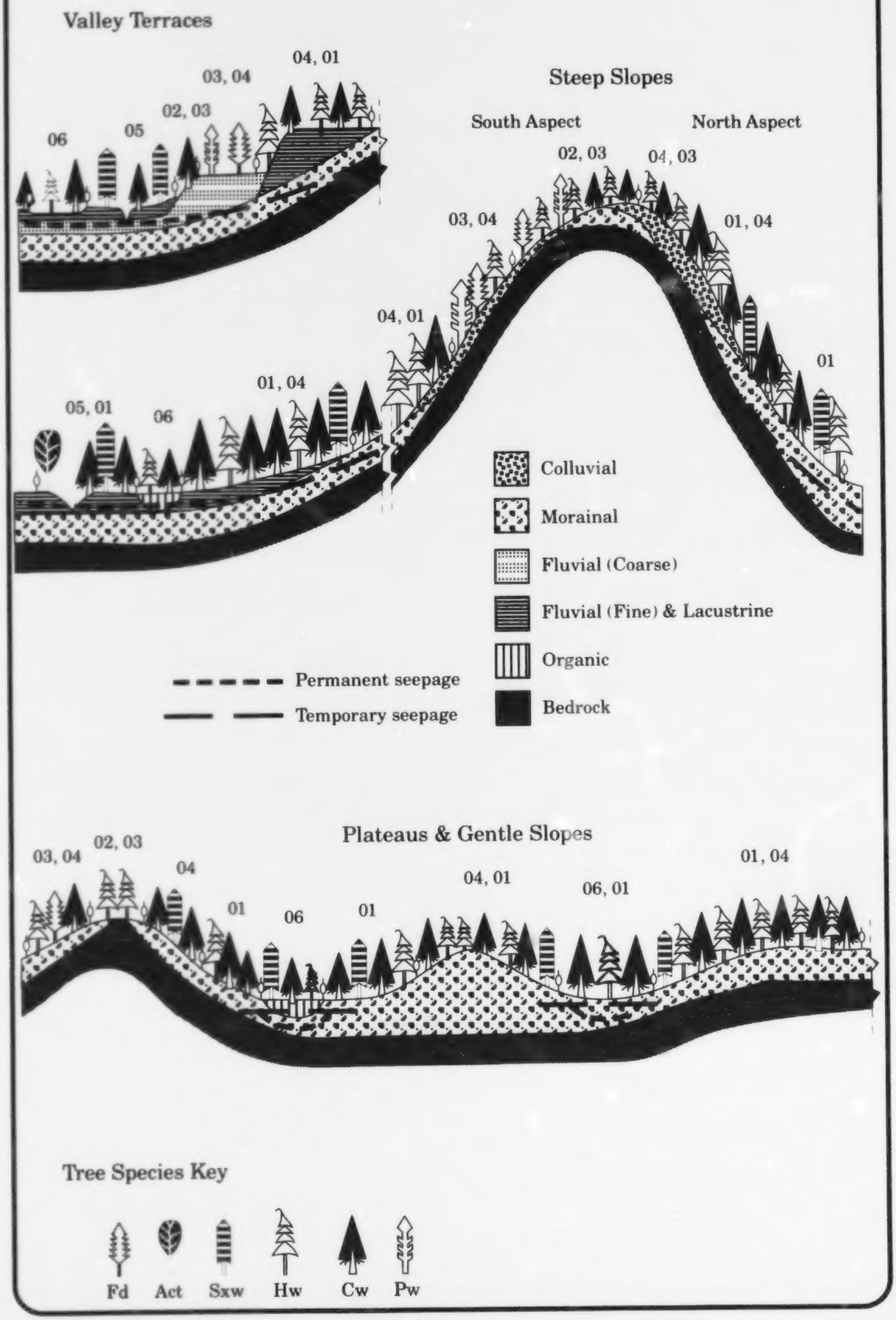
BGC Features: The ICHvk1 is distinguished from the adjacent ESSF zone by the presence of Cw and Hw, and by the absence of white-flowered rhododendron and Sitka valerian. The occurrence of devil's club and lady fern on zonal sites separates the ICHvk from other ICH subzones.

Comments: Most of this variant occurs in the Nelson Region. The ICHvk2 occurs in the Prince George Region.



02	HwCw — Falsebox — Feathermoss
03	CwHw — Oak fern — Foamflower
04	CwHw — Oak fern — Spiny wood fern
Zonal 01	CwHw — Devil's club — Lady fern
05	CwSxw — Devil's club — Horsetail
06	CwSxw — Skunk cabbage

ICH vk1


Valley Terraces
06
05
02, 03
03, 04
04, 01
Steep Slopes
South Aspect
North Aspect
02, 03
04, 03
03, 04
01, 04
04, 01
01
01, 04
05, 01
06
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 04
02, 03
04
01
06
01
04, 01
06, 01
01, 04
Tree Species Key
Fd
Act
Sxw
Hw
Cw
Pw

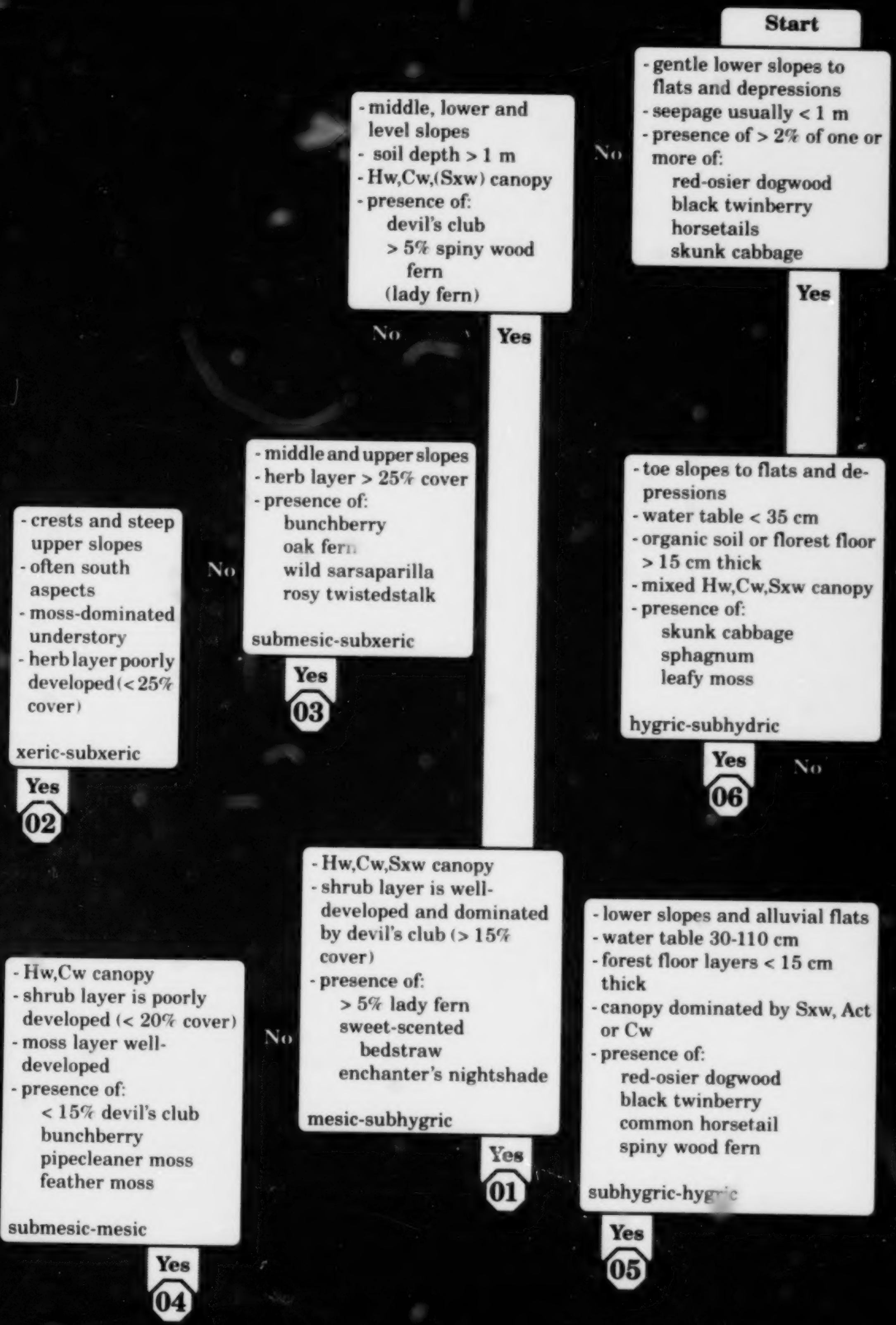
ICH vk1 Vegetation Table

	Site Units	02	03	04	01	05	06	
Trees	*Pseudotsuga menziesii var.glauca*	▮						interior Douglas-fir
	Picea engelmannii x glauca	▮	▮	▮	▮	■	▮	hybrid white spruce
	Tsuga heterophylla	▬▬	▬▬	▬▬	▬	▮	▬	western hemlock
	Thuja plicata	▬	▬	▬▬	▬▬	■	▬	western redcedar
	Populus balsamifera					■		black cottonwood
Shrubs	*Paxistima myrsinites*	■	▮					falsebox
	Taxus brevifolia	▮	▮					western yew
	Vaccinium membranaceum	▮	▮	▮	▮	▮		black huckleberry
	Vaccinium ovalifolium	▮	▮	▮	▮	▮		oval-leaved blueberry
	Oplopanax horridus		▮	▮	▬▬	▮	▮	devil's club
	Viburnum edule					▮		highbush cranberry
	Lonicera involucrata					■		black twinberry
	Cornus sericea					▬		red-osier dogwood
Herbs	*Clintonia uniflora*	▮	▮	■	▮			queen's cup
	Tiarella unifoliata	▮	■	▬	▬	▮	▮	one-leaved foamflower
	Aralia nudicaulis		▮					wild sarsaparilla
	Linnaea borealis		▮					twinflower
	Cornus canadensis		■	■			▮	bunchberry
	Streptopus roseus		▮	▮	▮	▮		rosy twistedstalk
	Dryopteris assimilis		▮	▬	▬	▮		spiny wood fern
	Gymnocarpium dryopteris		▬	▬	▬	▮	▮	oak fern
	Rubus pedatus			▮	▮			five-leaved bramble
	Circaea alpina				▮		▮	enchanter's nightshade
	Equisetum arvense					■		common horsetail
	Galium triflorum				▮	▮		sweet-scented bedstraw
	Athyrium filix-femina				▬	■	▬▬	lady fern
	Lysichiton americanum						▬▬	skunk cabbage
Mosses	*Pleurozium schreberi*	▬▬	▬	■			▮	red-stemmed feathermoss
	Rhytidiopsis robusta	▬	▬	■	▮		▮	pipecleaner moss
	Hylocomium splendens		■				▮	step moss
	Ptilium crista-castrensis			■				knight's plume
	Mnium spp.					■	▬▬	leafy mosses
	Sphagnum spp.						▬	sphagnums

ICH vk1 Environment Table

Site Units	02	03	04	01 Zonal	05	06
Soil Moisture Regime	X-SX	SM-SX	SM-M	M-SHG	SHG-HG	HG-SHD
Prevailing Successional Stage Sampled	Maturing Climax				Maturing Seral	Yng.&Mat. Climax
Aspect	All	South	All			N/A
Slope Gradient & Mesoslope Position	Steep Upper - crest	Steep - gentle Middle - upper	Steep - gentle Middle - lower	Gentle Mid.-low. & level	Gentle Lower & level	Flat - gentle Toe,level & depres.
Soil Texture Class	Variable	Coarse	Variable	Medium	Variable	
Parent Materials	Mv,Cb	Mb	Mb,FGt	Mb,(Fb)	Fb	Ov/Fb
Important Soil Features	Some L		--------		W 30-110	W<35

ICH vk1



- gentle lower slopes to flats and depressions
- seepage usually < 1 m
- presence of > 2% of one or more of:
  - red-osier dogwood
  - black twinberry
  - horsetails
  - skunk cabbage

- toe slopes to flats and depressions
- water table < 35 cm
- organic soil or florest floor > 15 cm thick
- mixed Hw,Cw,Sxw canopy
- presence of:
  - skunk cabbage
  - sphagnum
  - leafy moss

hygric-subhydric

- lower slopes and alluvial flats
- water table 30-110 cm
- forest floor layers < 15 cm thick
- canopy dominated by Sxw, Act or Cw
- presence of:
  - red-osier dogwood
  - black twinberry
  - common horsetail
  - spiny wood fern

subhygric-hygric

- middle, lower and level slopes
- soil depth > 1 m
- Hw,Cw,(Sxw) canopy
- presence of:
  - devil's club
  - > 5% spiny wood fern
  - (lady fern)

- Hw,Cw,Sxw canopy
- shrub layer is well-developed and dominated by devil's club (> 15% cover)
- presence of:
  - > 5% lady fern
  - sweet-scented bedstraw
  - enchanter's nightshade

mesic-subhygric

- Hw,Cw canopy
- shrub layer is poorly developed (< 20% cover)
- moss layer well-developed
- presence of:
  - < 15% devil's club
  - bunchberry
  - pipecleaner moss
  - feather moss

submesic-mesic

- middle and upper slopes
- herb layer > 25% cover
- presence of:
  - bunchberry
  - oak fern
  - wild sarsaparilla
  - rosy twistedstalk

submesic-subxeric

- crests and steep upper slopes
- often south aspects
- moss-dominated understory
- herb layer poorly developed (< 25% cover)

xeric-subxeric

WELLS GRAY WET COOL INTERIOR CEDAR – HEMLOCK VARIANT

Distribution: The ICHwk1 occurs at mid-elevations, and in the valley bottoms of Scotch Creek and the Clearwater, Upper North Thompson, Upper Shuswap, Adams and Seymour river drainages. It occurs below the ESSFwc2 and ICHvk1 and above the ICHmw.

Elevational Range (Mean): 650-1375 m

Climate: The ICH is warmer than the MS and ESSF and wetter than the IDF and MS. The ICHwk1 is moister, cooler and receives more snow than either the ICHmw or ICHmk, but it is drier and warmer than the ICHvk1. A snow pack of 1-2 m is common.

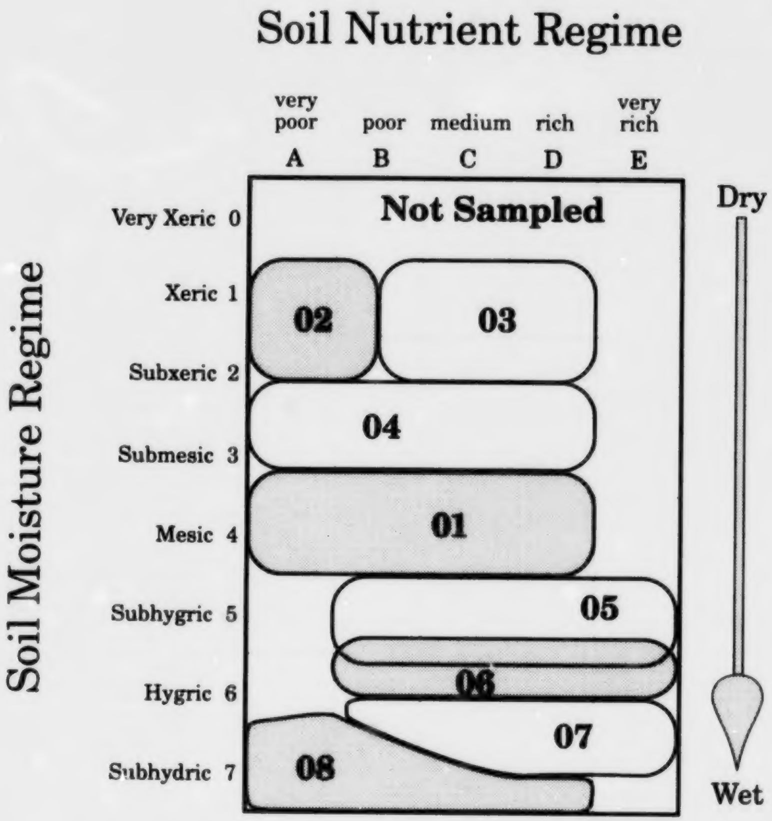
Vegetation and Soils

Zonal Sites: Dense mature climax stands are formed by Hw and Cw. The herb-moss dominated understory contains oak fern, one-leaved foamflower, queen's cup and bunchberry. There is a well-developed moss cover of red-stemmed feathermoss and step moss, with lesser amounts of knight's plume and pipecleaner moss. Humo-Ferric and Ferro-Humic Podzols are the common soils.

Dry Sites: Hw dominated mature climax stands, with Cw and minor amounts of the seral species Pw and Fd, have a moss-dominated understory containing feathermoss and step moss. There is a sparse cover of falsebox, black huckleberry, prince's pine and twinflower.

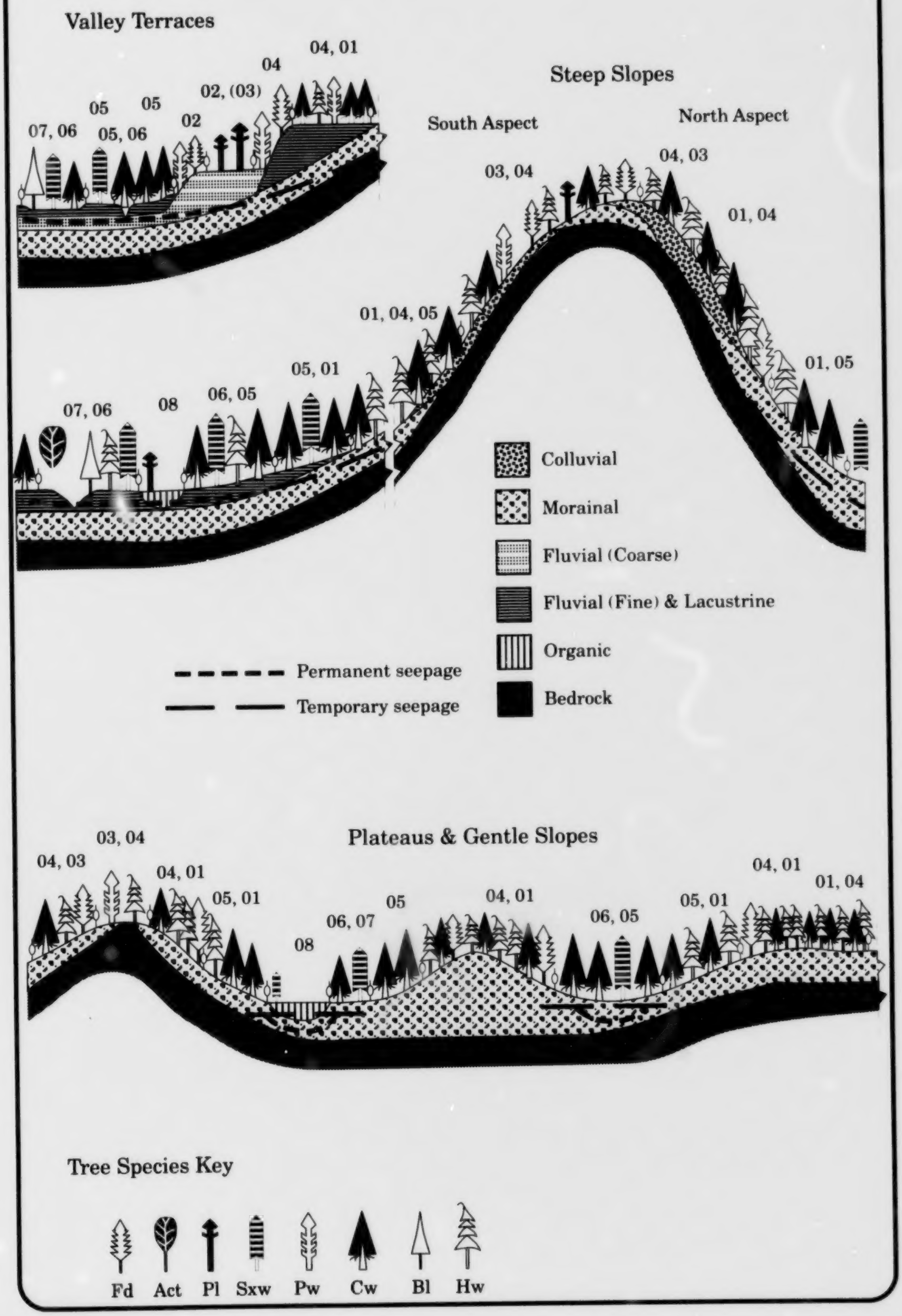
Wet Sites: Mature climax stands are composed of Cw and Hw, with minor amounts of Sxw and Bl. Shrubby seepage sites are dominated by devil's club, with a rich herb layer of oak fern, lady fern and one-leaved foamflower, and a poorly developed moss layer. On recent fluvial deposits, thimbleberry, black twinberry, red-osier dogwood and common horsetails are dominant. On collecting sites, the understory consists of oval-leaved blueberry, lady fern, skunk cabbage, leafy moss and red-stemmed feathermoss.

BGC Features: The presence of Cw and Hw distinguishes the ICH from all other interior zones. The moderately developed, oak fern dominated herb layer separates the ICHwk1 from the ICH mw. The lack of lady fern and devil's club on zonal sites distinguishes this variant from the ICHvk1. The presence of Hw

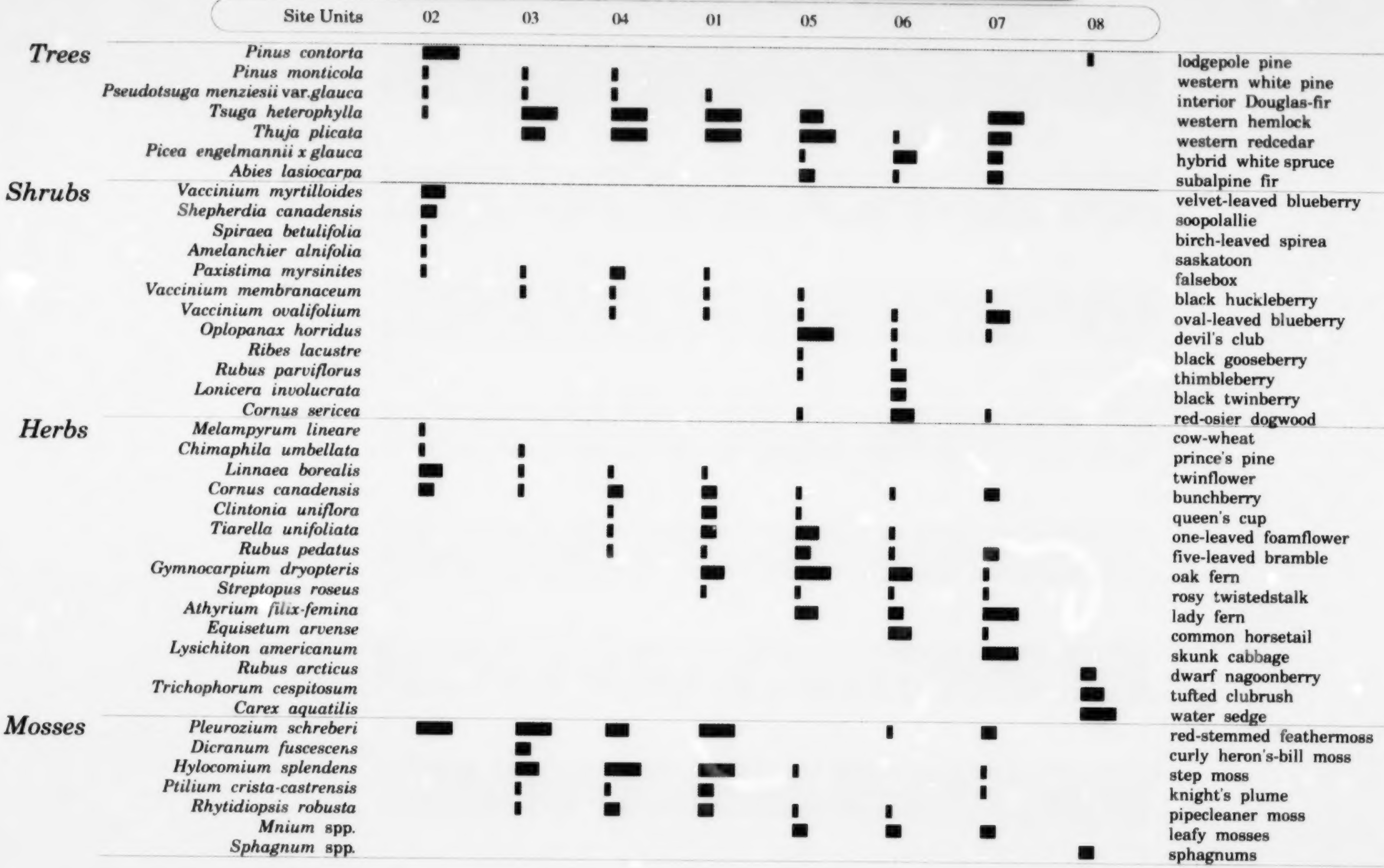


02	PlHw — Velvet-leaved blueberry
03	HwCw — Step moss
04	HwCw — Falsebox — Feathermoss
Zonal 01	CwHw — Oak fern
05	CwHw — Devil's club — Lady fern
06	CwSxw — Devil's club — Horsetail
07	CwSxw — Skunk cabbage
08	Sedge — Sphagnum

ICH wk1

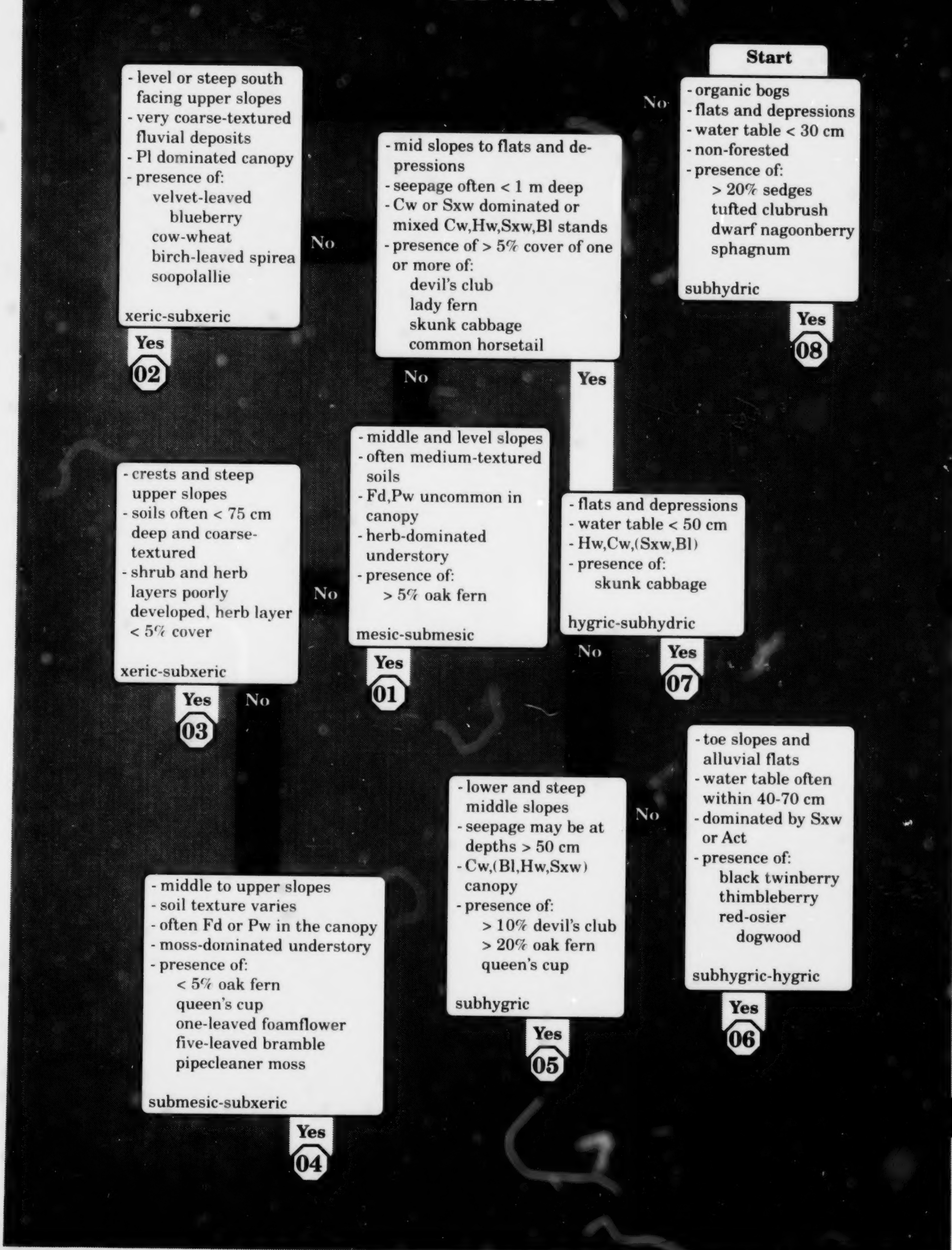

Valley Terraces
04, 01
04
02, (03)
05
05
02
07, 06
05, 06
Steep Slopes
South Aspect
North Aspect
03, 04
04, 03
01, 04
01, 04, 05
05, 01
06, 05
07, 06
08
01, 05
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 04
04, 03
04, 01
05, 01
08
06, 07
05
04, 01
06, 05
05, 01
04, 01
01, 04
Tree Species Key
Fd
Act
Pl
Sxw
Pw
Cw
Bl
Hw

ICH wk1 Vegetation Table



ICH wk1 Environment Table

Site Units	02	03	04	01	05	06	07	08
				Zonal				
Soil Moisture Regime	X-SX	X-SX	SM-SX	M-SM	SHG-(M)	SHG-HG	HG-SHD	SHD
Prevailing Successional Stage Sampled	Maturing Seral	Maturing Climax				Maturing Seral	Maturing Climax	
Aspect	South	All				N/A		
Slope Gradient & Mesoslope Position	Flat - steep Middle - upper	Steep Upper & crest	Steep Middle - upper	Gentle Middle & level	Steep Middle - lower	Gentle Toe & level	Gentle Level & depression	Flat Depression & level
Soil Texture Class	V. Coarse	Coarse	Variable	Medium	Variable			Organic
Parent Materials	Fb,FGt	Mv,Cv	Mb,Cb,Fb	Mb	Mb,Fb	Fb	Ov/Fb	Ob
Important Soil Features	V. Coarse	L<75	--------		W 50-110	W 40-70	W 25-50	W 2-30



- organic bogs
- flats and depressions
- water table < 30 cm
- non-forested
- presence of:
  - > 20% sedges
  - tufted clubrush
  - dwarf nagoonberry
  - sphagnum

subhydric

- level or steep south facing upper slopes
- very coarse-textured fluvial deposits
- Pl dominated canopy
- presence of:
  - velvet-leaved blueberry
  - cow-wheat
  - birch-leaved spirea
  - soopolallie

xeric-subxeric

- mid slopes to flats and depressions
- seepage often < 1 m deep
- Cw or Sxw dominated or mixed Cw,Hw,Sxw,Bl stands
- presence of > 5% cover of one or more of:
  - devil's club
  - lady fern
  - skunk cabbage
  - common horsetail

- middle and level slopes
- often medium-textured soils
- Fd,Pw uncommon in canopy
- herb-dominated understory
- presence of:
  - > 5% oak fern

mesic-submesic

- crests and steep upper slopes
- soils often < 75 cm deep and coarse-textured
- shrub and herb layers poorly developed, herb layer < 5% cover

xeric-subxeric

- flats and depressions
- water table < 50 cm
- Hw,Cw,(Sxw,Bl)
- presence of:
  - skunk cabbage

hygric-subhydric

- toe slopes and alluvial flats
- water table often within 40-70 cm
- dominated by Sxw or Act
- presence of:
  - black twinberry
  - thimbleberry
  - red-osier dogwood

subhygric-hygric

- lower and steep middle slopes
- seepage may be at depths > 50 cm
- Cw,(Bl,Hw,Sxw) canopy
- presence of:
  - > 10% devil's club
  - > 20% oak fern
  - queen's cup

subhygric

- middle to upper slopes
- soil texture varies
- often Fd or Pw in the canopy
- moss-dominated understory
- presence of:
  - < 5% oak fern
  - queen's cup
  - one-leaved foamflower
  - five-leaved bramble
  - pipecleaner moss

submesic-subxeric

OKANAGAN DRY COLD
ENGELMANN SPRUCE – SUBALPINE FIR VARIANT

Distribution: The ESSFdc1 has limited distribution. It occurs on the upper slopes and ridge tops of the Okanagan Highlands. It occurs above the MSdm1 and, to a lesser extent, the ICHmk1.

Elevational Range (Mean): 1600-1950 m

Climate: The ESSF zone is characterized by long, cold winters with a high snowcover and short, cool summers. The ESSFdc1 is wetter than the ESSFxc, but drier than other ESSF subzones in the KFR.

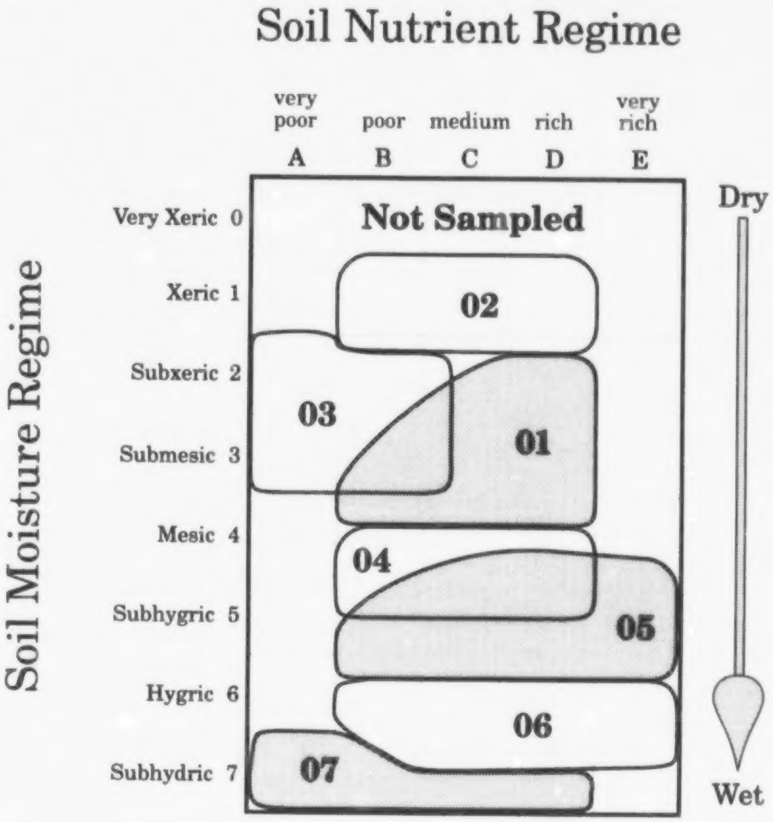
Vegetation and Soils

Zonal Sites: Successional stands of Pl, Se and Bl form the tree layer. White-flowered rhododendron and grouseberry dominate the shrubby understory. Red-stemmed feathermoss and pipecleaner moss occur sporadically. The common soils are Humo-Ferric Podzols and Dystric Brunisols.

Dry sites: Mature, seral stands of Pl, with varying amounts of Se and Bl occur. Black huckleberry forms the sparse shrub layer. The herbaceous understory contains pinegrass, grouseberry, and few other species. Various lichens are present.

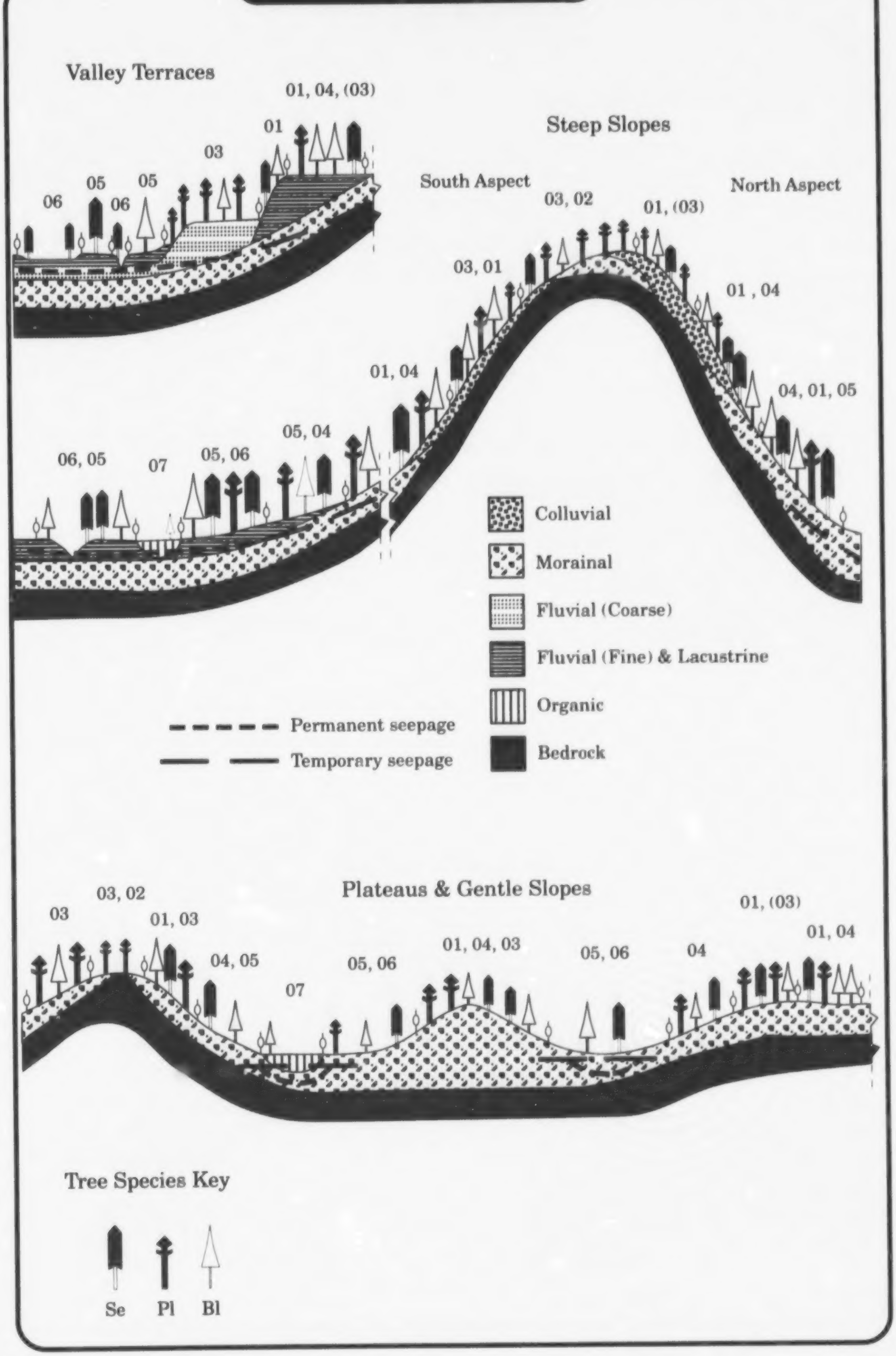
Wet Sites: Mixed, mature, seral stands of Pl, Bl and Se are common. Grouseberry dominates, with Sitka valerian, five-leaved bramble and trapper's tea present. Wetter sites have sedges and a moderate cover of sphagnum and glow moss, and often support stunted stands.

BGC Features: The presence of white-flowered rhododendron and Sitka valerian distinguishes the ESSF from other zones. The lack of white-flowered rhododendron in the ESSFxc, except on north-facing slopes, and the occurrence of false azalea, oak fern and rosy twistedstalk in the ESSFwc2 and trapper's tea throughout the ESSFdc2, distinguishes these units from the ESSFdc1.



02	PlSe — Pinegrass
03	Bl — Grouseberry — Cladonia
Zonal 01	Bl — Rhododendron — Grouseberry
04	Bl — Rhododendron — Valerian
05	Bl — Trapper's tea
06	Bl — Horsetail — Glow moss
07	Sedge — Sphagnum

ESSF dc1



Valley Terraces
01, 04, (03)
01
03
05
06
05
06
Steep Slopes
South Aspect
North Aspect
03, 02
01, (03)
03, 01
01 , 04
01, 04
04, 01, 05
05, 04
06, 05
07
05, 06
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03
03, 02
01, 03
04, 05
07
05, 06
01, 04, 03
05, 06
04
01, (03)
01, 04
Tree Species Key
Se
Pl
Bl

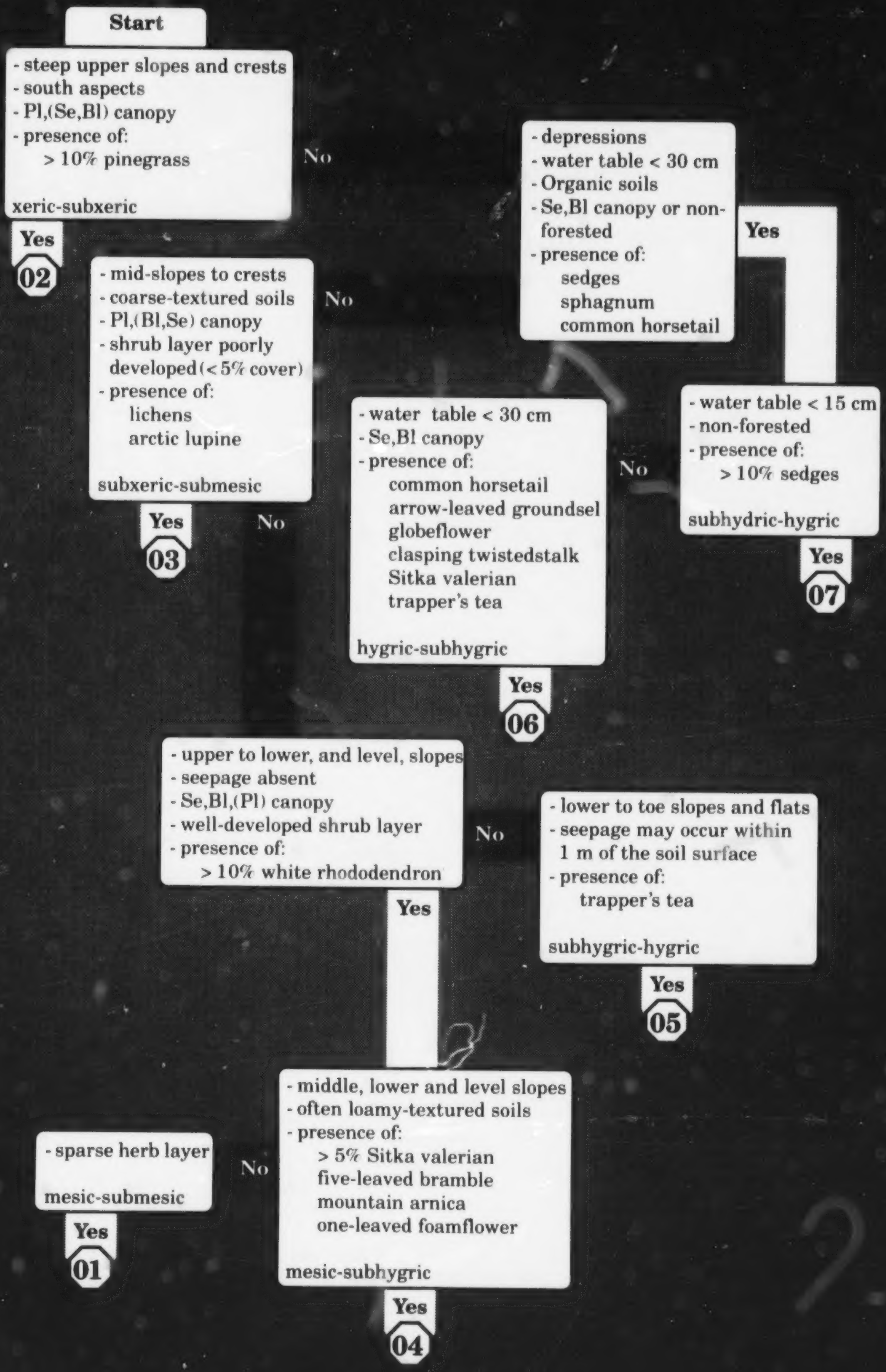
ESSF dc1 Vegetation Table

	Site Units	02	03	01	04	05	06	07	
Trees	*Pinus contorta*	■■■	■■■	■■	■■	■			lodgepole pine
	Picea engelmannii	■■	▮	■■	■	■■	■■		Engelmann spruce
	Abies lasiocarpa	■	■■	■■■	■■	■■	■		subalpine fir
Shrubs	*Rhododendron albiflorum*			■■■	■■■				white-flowered rhododendron
	Vaccinium membranaceum		▮	■	■	▮			black huckleberry
	Ledum glandulosum					■	■		trapper's tea
Herbs	*Calamagrostis rubescens*	■■■							pinegrass
	Antennaria racemosa	▮							racemose pussytoes
	Lupinus arcticus	▮	▮						arctic lupine
	Tiarella unifoliata				▮	▮			one-leaved foamflower
	Vaccinium scoparium	■■■	■■■	■■	■■	■■■	■■	▮	grouseberry
	Rubus pedatus			▮	■■	■	▮		five-leaved bramble
	Valeriana sitchensis				■■	■■	■	▮	Sitka valerian
	Arnica latifolia			▮	■	▮	▮		mountain arnica
	Streptopus amplexifolius						▮		clasping twistedstalk
	Trollius laxus						▮		globeflower
	Senecio triangularis						▮		arrow-leaved groundsel
	Equisetum arvense						■■		common horsetail
	Carex spp.						▮	■■■	sedges
Mosses, Lichens & Liverworts	*Cladonia* spp.	■	▮						lichens
	Pleurozium schreberi		▮	■■	▮	■			red-stemmed feathermoss
	Barbilophozia spp.			■	■■	■	■		liverworts
	Rhytidiopsis robusta				▮	▮			pipecleaner moss
	Calliergon spp.						▮		mosses
	Aulacomnium palustre					▮	■	■	glow moss
	Sphagnum spp.						■■	■■	sphagnums

ESSF dc1 Environment Table

Site Units	02	03	01	04	05	06	07
			Zonal				
Soil Moisture Regime	X-SX	SM-SX	M-SM	M-SHG	SHG-HG	HG-SHG	SHD-HG
Prevailing Successional Stage Sampled	Maturing Seral					Maturing Climax	
Aspect	South	All				N/A	
Slope Gradient & Mesoslope Position	Steep Upper & crest	Gentle - steep Mid.-upp. & crest	Gentle - steep Middle & level		Gentle Lower - toe & depress.	Flat Level & depression	
Soil Texture Class	Variable	Coarse	Variable	Medium	Variable	Organic	
Parent Materials	Mb,Mv	Fb,Mb	Mb		Mb,Fb/Mb	Ov/Fb,Ob	Ob-Ov/Fb
Important Soil Features	---	Coarse	---		W 20-80	W 10-40	W 0-35

ESSF dc1


Start
- steep upper slopes and crests
- south aspects
- Pl,(Se,Bl) canopy
- presence of:
> 10% pinegrass
xeric-subxeric
Yes
02
No
- mid-slopes to crests
- coarse-textured soils
- Pl,(Bl,Se) canopy
- shrub layer poorly developed (< 5% cover)
- presence of:
lichens
arctic lupine
subxeric-submesic
Yes
03
No
No
- depressions
- water table < 30 cm
- Organic soils
- Se,Bl canopy or non-forested
- presence of:
sedges
sphagnum
common horsetail
Yes
- water table < 15 cm
- non-forested
- presence of:
> 10% sedges
subhydric-hygric
Yes
07
No
- water table < 30 cm
- Se,Bl canopy
- presence of:
common horsetail
arrow-leaved groundsel
globeflower
clasping twistedstalk
Sitka valerian
trapper's tea
hygric-subhygric
Yes
06
- upper to lower, and level, slopes
- seepage absent
- Se,Bl,(Pl) canopy
- well-developed shrub layer
- presence of:
> 10% white rhododendron
No
- lower to toe slopes and flats
- seepage may occur within 1 m of the soil surface
- presence of:
trapper's tea
subhygric-hygric
Yes
05
Yes
- middle, lower and level slopes
- often loamy-textured soils
- presence of:
> 5% Sitka valerian
five-leaved bramble
mountain arnica
one-leaved foamflower
mesic-subhygric
Yes
04
No
- sparse herb layer
mesic-submesic
Yes
01

THOMPSON DRY COLD
ENGELMANN SPRUCE – SUBALPINE FIR VARIANT

Distribution: The ESSFdc2 occurs on upper slopes and ridge tops from Terrace Mountain to Tuktakamin Mountain on the west side of the Okanagan Valley. It also occupies the upper slopes along the North Thompson River from Kamloops to Clearwater, including Cahilty, Tod and Baldy, and the upper elevations on the lee side of the Cascade Mountains from the U.S. border to Lytton. It occurs mainly above the MSdm2.

Elevational Range (Mean): 1520-1900 m

Climate: The ESSF zone is characterized by long, cold winters with a high snowcover, and short, cool summers. The ESSFdc2 is moister than the ESSF dc1 and ESSFxc, but drier than the remaining ESSF subzones and variants in the KFR.

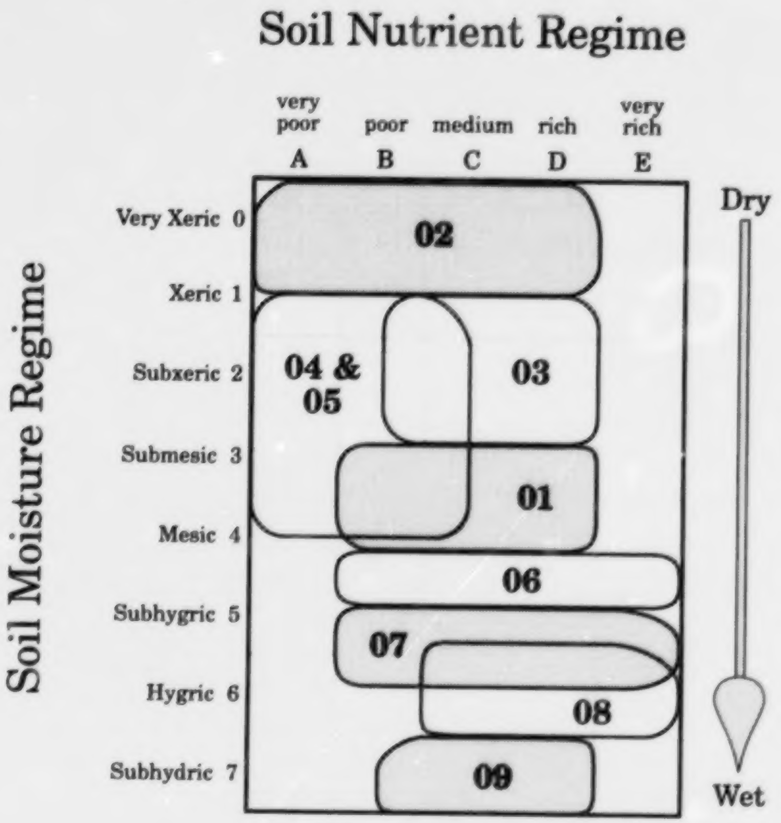
Vegetation and Soils

Zonal Sites: Se and Bl form mature climax stands. White-flowered rhododendron dominates the shrubby understory, with lesser amounts of black huckleberry. The less conspicuous herb layer consists of grouseberry and Sitka valerian. Bryophytes are very sparse. Humo-Ferric Podzols and Dystric Brunisols are the dominant soils.

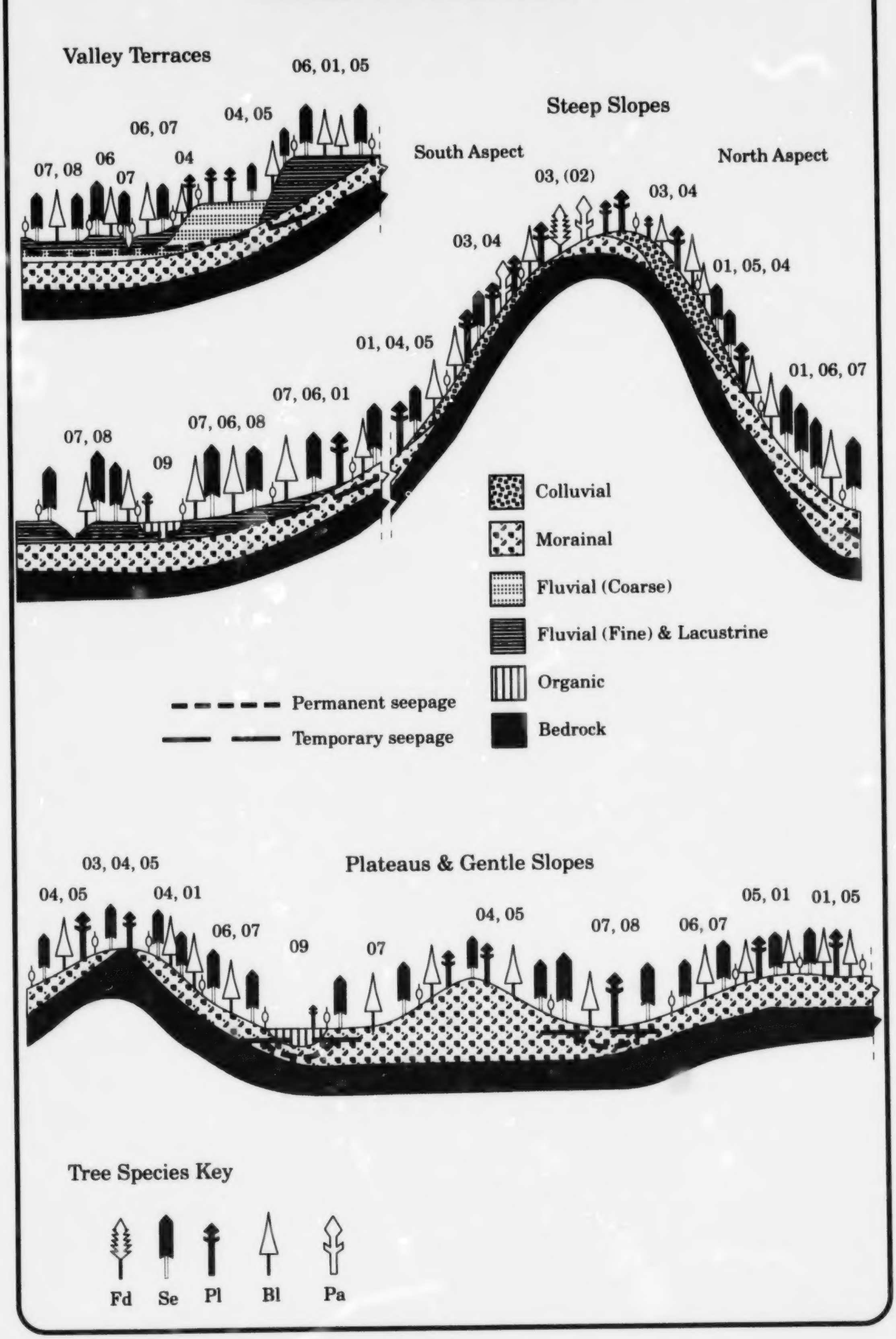
Dry Sites: Pl dominates open, mature seral stands, with Bl regenerating throughout the understory. Pinegrass and grouseberry dominate a well-developed herb layer. Heart-leaved arnica, racemose pussytoes and falsebox occur in lesser amounts. Bryophytes are sparse.

Wet Sites: These sites are characterized by dense stands of Bl and Se. Pl occurs in successional stands. A lush herb layer dominates the understory. Sitka valerian is most abundant and there are lesser amounts of five-leaved bramble, one-leaved foamflower and rosy twistedstalk, with a moderate cover of white-flowered rhododendron. The moss layer is sparse.

BGC Features: The presence of white-flowered rhododendron and Sitka valerian distinguishes the ESSF from other zones. The absence of white-flowered rhododendron on zonal sites in the ESSFxc, and the presence of false azalea, oak fern and rosy twistedstalk in the ESSFwc2, Ba and Hm in the ESSFmw, and trapper's tea on azonal sites in the ESSFdc1 distinguishes these units from the ESSFdc2.



02	Juniper — Pinegrass
03	PlSe — Falsebox — Pinegrass
04	Bl — Grouseberry — Cladonia
05	Bl — Huckleberry — Feathermoss
Zonal 01	Bl — Rhododendron — Grouseberry
06	Bl — Gooseberry — Oak fern
07	Bl — Rhododendron — Valerian
08	Bl — Trapper's tea
09	Sedge — Sphagnum


Valley Terraces
06, 01, 05
04, 05
06, 07
06
04
07, 08
07
Steep Slopes
South Aspect
North Aspect
03, (02)
03, 04
03, 04
01, 05, 04
01, 04, 05
01, 06, 07
07, 06, 01
07, 06, 08
07, 08
09
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 04, 05
04, 05
04, 01
06, 07
09
07
04, 05
07, 08
06, 07
05, 01
01, 05
Tree Species Key
Fd
Se
Pl
Bl
Pa

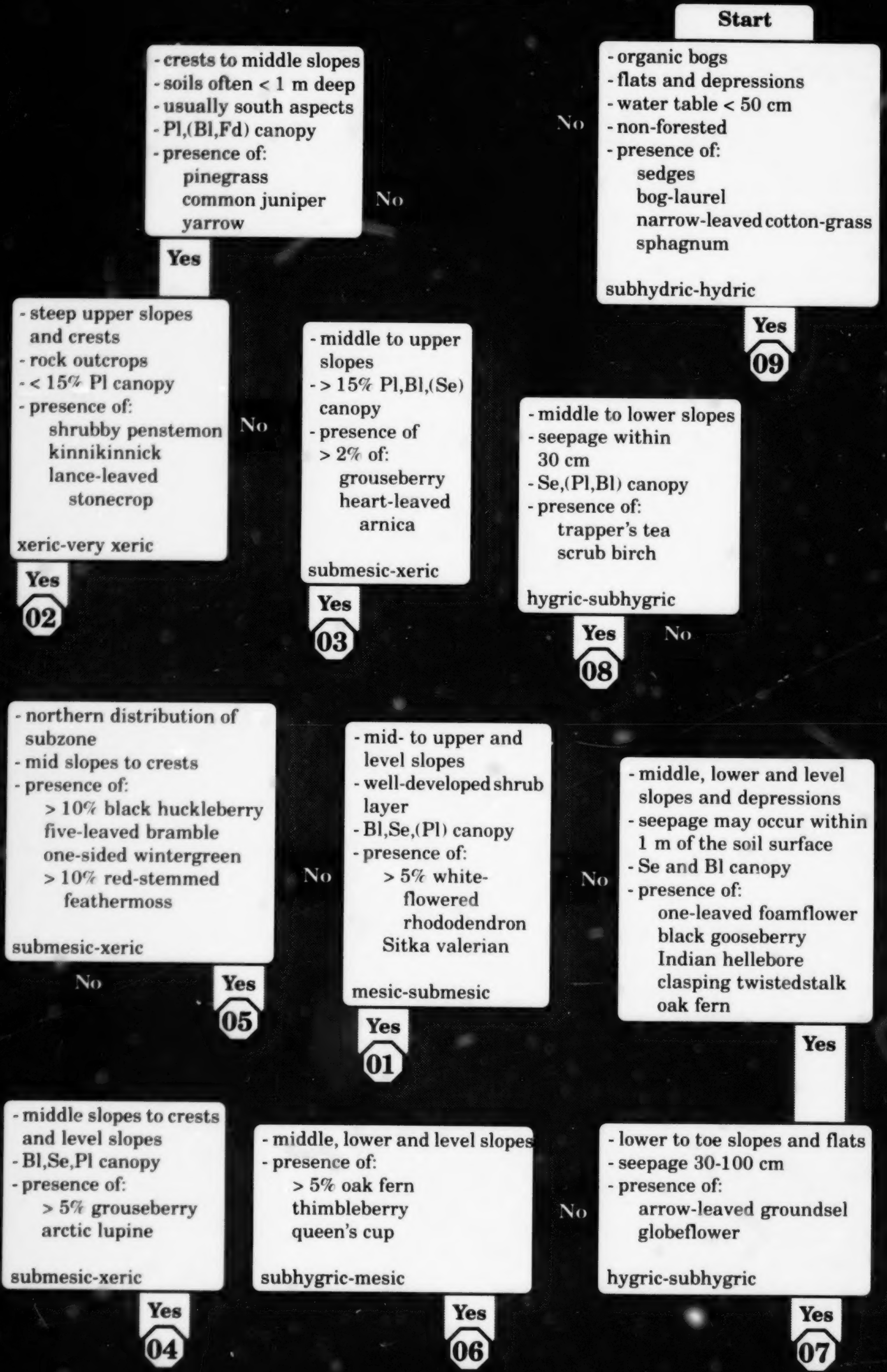
ESSF dc2 Vegetation Table

	Site Units	02	03	04	05	01	06	07	08	09	
Trees	*Pinus contorta*	▮	▬	■	■	▮	▮		■	■	lodgepole pine
	Abies lasiocarpa		■	▬	▬	▬	▬	■	■		subalpine fir
	Picea engelmannii		▮	■	■	■	▬	▬	▬	▮	Engelmann spruce
Shrubs	*Penstemon fruticosus*	▮									shrubby penstemon
	Juniperus communis	■	▮								common juniper
	Spiraea betulifolia	▮	▮		▮						birch-leaved spirea
	Paxistima myrsinites	▮	■		▮	▮			▮		falsebox
	Vaccinium membranaceum		▮	▮	■	■	■	■	▮		black huckleberry
	Rhododendron albiflorum					▬	▮	■			white-flowered rhododendron
	Ribes lacustre						■	▮	■		black gooseberry
	Lonicera involucrata								▮		black twinberry
	Betula glandulosa								▮		scrub birch
	Ledum glandulosum								■	▮	trapper's tea
Herbs	*Achillea millefolium*	▮									yarrow
	Arctostaphylos uva-ursi	▮									kinnikinnick
	Sedum lanceolatum	▮									lance-leaved stonecrop
	Calamagrostis rubescens	■	■								pinegrass
	Antennaria racemosa	▮	▮								racemose pussytoes
	Lupinus arcticus		▮	▮							arctic lupine
	Vaccinium scoparium		■	▬		■	▮	▮	▬		grouseberry
	Lycopodium annotinum				▮						stiff clubmoss
	Arnica cordifolia		■			▮		■	▮		heart-leaved arnica
	Orthilia secunda				■	▮	▮	▮	▮		one-sided wintergreen
	Rubus pedatus				▮	▮	▮	■	■		five-leaved bramble
	Arnica latifolia					▮	▮	▮			mountain arnica
	Valeriana sitchensis					■	■	▬			Sitka valerian
	Gymnocarpium dryopteris						■				oak fern
	Streptopus roseus						▮	■			rosy twistedstalk
	Tiarella unifoliata						▮	■			one-leaved foamflower
	Veratrum viride						▮	▮			Indian hellebore
	Streptopus amplexifolius							▮			clasping twistedstalk
	Trollius laxus							▮			globeflower
	Senecio triangularis							▮			arrow-leaved groundsel
	Eriophorum angustifolium									▮	narrow-leaved cotton-grass
	Calamagrostis canadensis									▮	bluejoint
	Kalmia microphylla									▮	alpine bog-laurel
	Carex spp.									■	sedges
Mosses & Lichens	*Cladonia* spp.			■							lichens
	Pleurozium schreberi				▬		▮				red-stemmed feathermoss
	Rhytidiopsis robusta								■		pipecleaner moss
	Sphagnum spp.									■	sphagnums

ESSF dc2 Environment Table

Site Units	02	03	04	05	01	06	07	08	09
					Zonal				
Ecological Moisture Regime	X-VX	SM-X	SM-X	SM-X	M-SM	SHG-M	SHG-HG	HG-SHG	SHD-HG
Prevailing Successional Stage Sampled	Young Climax	Maturing Seral			Maturing Climax		Maturing Seral		Young Climax
Aspect	South	All						N/A	
Slope Gradient & Mesoslope Position	Steep Upper & crest	Gentle - steep Middle - upper	Gentle Level & crest	Gentle Middle & crest	Gentle Mid.-upp. & level	Gentle Mid.-low. & level	Gentle Low.,level & depres.	Gentle Mid.-low. & level	Flat Depression
Soil Texture Class	Medium		Variable			Medium		Variable	Organic
Parent Materials	Cv ,(Mv)	Mb,Mv,Cv	Mb,Mv	Mb	Mb,(Fb)	Mb,Fb	Fv/Mb,Fb	Mb	Ob,Ov/Mb
Important Soil Features	L 10-100	Some L		--------		Minor W	W 30-100	W 15-30	W 0-50

ESSF dc2



Start

- organic bogs
- flats and depressions
- water table < 50 cm
- non-forested
- presence of:
  - sedges
  - bog-laurel
  - narrow-leaved cotton-grass
  - sphagnum

subhydric-hydric

Yes 09

No

- crests to middle slopes
- soils often < 1 m deep
- usually south aspects
- Pl,(Bl,Fd) canopy
- presence of:
  - pinegrass
  - common juniper
  - yarrow

Yes

No

- steep upper slopes and crests
- rock outcrops
- < 15% Pl canopy
- presence of:
  - shrubby penstemon
  - kinnikinnick
  - lance-leaved stonecrop

xeric-very xeric

Yes 02

No

- middle to upper slopes
- > 15% Pl,Bl,(Se) canopy
- presence of > 2% of:
  - grouseberry
  - heart-leaved arnica

submesic-xeric

Yes 03

- middle to lower slopes
- seepage within 30 cm
- Se,(Pl,Bl) canopy
- presence of:
  - trapper's tea
  - scrub birch

hygric-subhygric

Yes 08

No

- northern distribution of subzone
- mid slopes to crests
- presence of:
  - > 10% black huckleberry
  - five-leaved bramble
  - one-sided wintergreen
  - > 10% red-stemmed feathermoss

submesic-xeric

Yes 05

No

No

- mid- to upper and level slopes
- well-developed shrub layer
- Bl,Se,(Pl) canopy
- presence of:
  - > 5% white-flowered rhododendron
  - Sitka valerian

mesic-submesic

Yes 01

No

- middle, lower and level slopes and depressions
- seepage may occur within 1 m of the soil surface
- Se and Bl canopy
- presence of:
  - one-leaved foamflower
  - black gooseberry
  - Indian hellebore
  - clasping twistedstalk
  - oak fern

Yes

- middle slopes to crests and level slopes
- Bl,Se,Pl canopy
- presence of:
  - > 5% grouseberry
  - arctic lupine

submesic-xeric

Yes 04

- middle, lower and level slopes
- presence of:
  - > 5% oak fern
  - thimbleberry
  - queen's cup

subhygric-mesic

Yes 06

No

- lower to toe slopes and flats
- seepage 30-100 cm
- presence of:
  - arrow-leaved groundsel
  - globeflower

hygric-subhygric

Yes 07

DRY VERY COLD ENGELMANN SPRUCE – SUBALPINE FIR SUBZONE

Distribution: The ESSFdv occurs west of the Fraser River on the upper slopes of the Yalakom, Hurley, Stein and Bridge rivers, Cayoosh Creek, and their tributaries. It also occurs on the upper slopes of the Camelsfoot Range. It occurs mainly above the MSxk or MSdc and below the AT.

Elevational Range (Mean): 1500-1900 m

Climate: The ESSF zone is characterized by long, cold winters with a high snowcover and short, cool summers. The ESSFdv is wetter than the ESSFxc, drier than the ESSFwc2, vc, vv and mw, and colder than the ESSFdc.

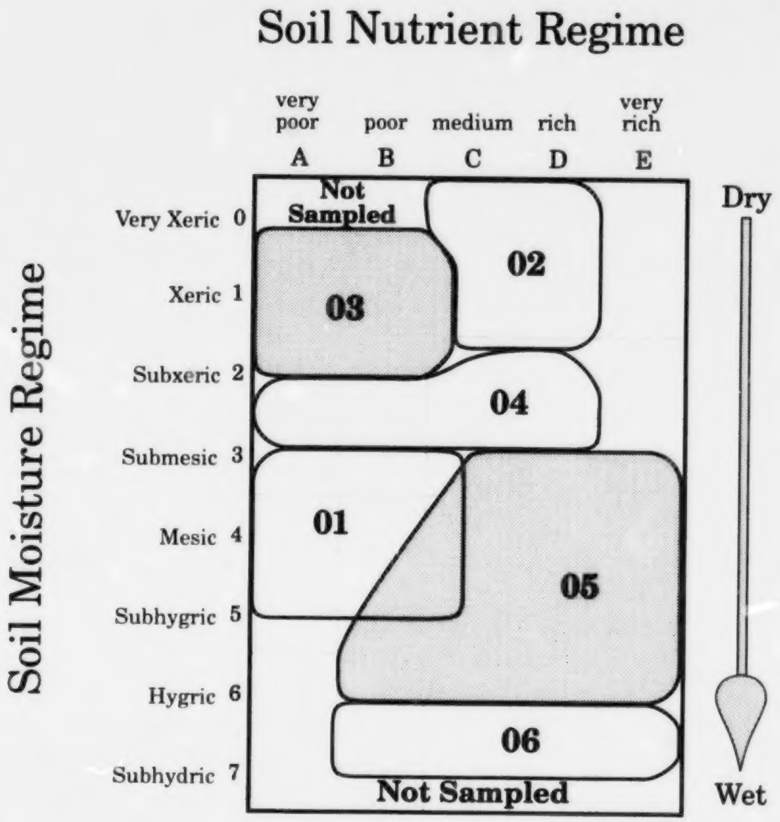
Vegetation and Soils

Zonal Sites: Climax stands contain Bl and Se. The important seral species are Pl and Pa. The understory is shrubby and dominated by white-flowered rhododendron and black huckleberry. Herbs are sparse. Red-stemmed feathermoss, *Dicranum* spp. and the liverworts *Barbilophozia* spp. dominate a moderately well-developed moss layer. Common soils are Humo-Ferric Podzols and Dystric Brunisols.

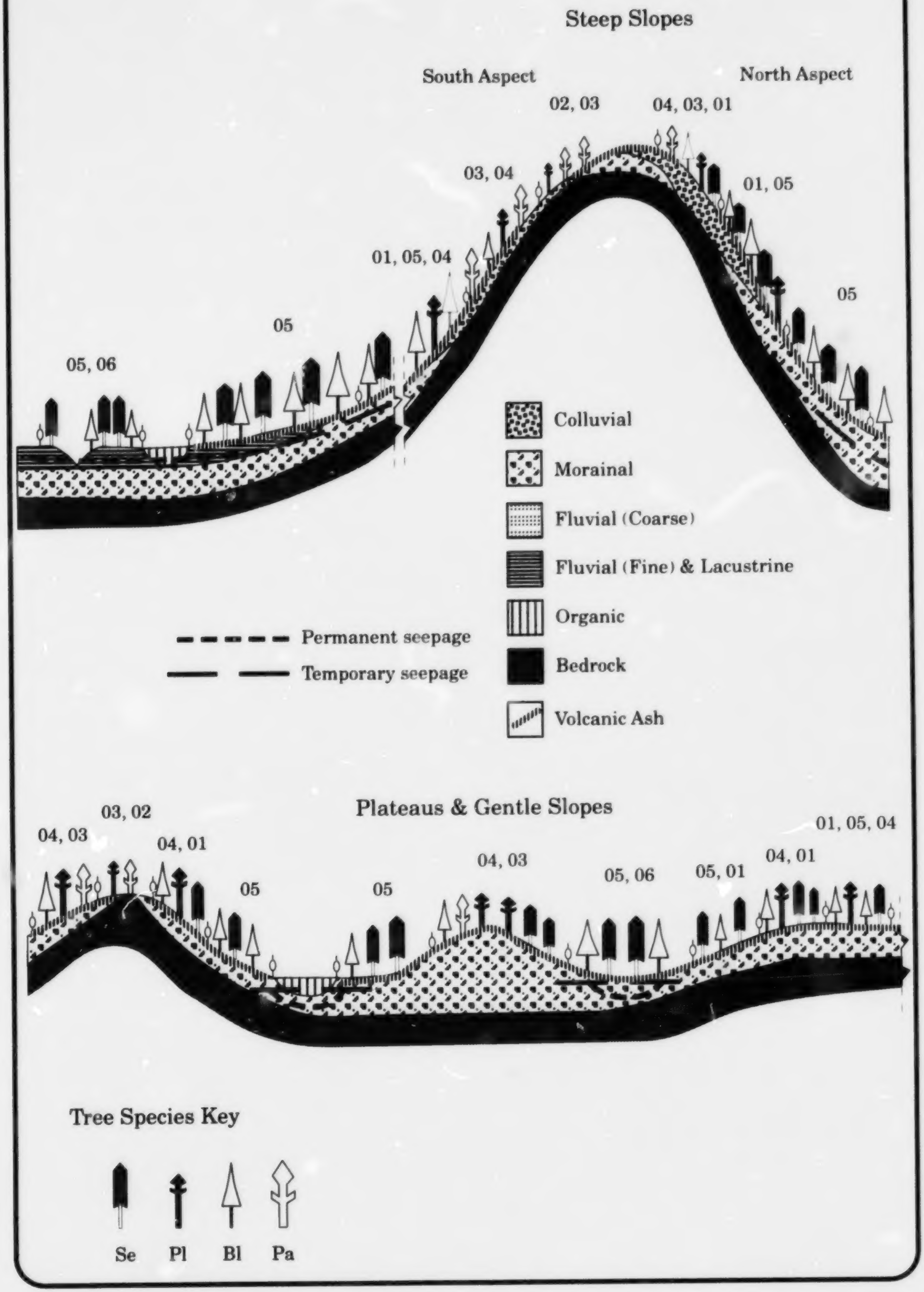
Dry Sites: Mature seral stands contain Pl and Pa mixed with regenerating Bl and Se. The stands are open, with a low cover of understory species. Common juniper, black huckleberry, arctic lupine and pinegrass are dominant. The bryophyte layer is poorly represented, although *Dicranum* spp. and *Peltigera aphthosa* are common. Drier, high-elevation sites on gentle, south-facing slopes with fine-textured, shallow soils support scattered Pa and a low cover of junegrass.

Wet Sites: Mature climax stands have a canopy of Bl and Se. The shrub-herb dominated understory contains black gooseberry, white-flowered rhododendron and a wide variety of low cover herbs. Even wetter sites are dominated by common horsetails, leatherleaf saxifrage and leafy mosses.

BGC Features: The presence of white-flowered rhododendron and Sitka valerian distinguishes the ESSF from other zones. White-flowered rhododendron occurs on zonal sites in the ESSFdv, but is restricted to north slopes in the ESSFxc. The lack of Hm and Ba separates the ESSFdv from the ESSFmw.



02	Pa — Junegrass
03	BlPa — Juniper
04	Bl — Huckleberry — Brachythecium
Zonal 01	Bl — Rhododendron — Heron's-bill
05	Bl — Valerian — Arnica
06	Bl — Horsetail — Glow moss


Steep Slopes
South Aspect
North Aspect
02, 03
04, 03, 01
03, 04
01, 05
01, 05, 04
05
05
05, 06
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Volcanic Ash
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 02
04, 03
04, 01
05
05
04, 03
05, 06
05, 01
04, 01
01, 05, 04
Tree Species Key
Se
Pl
Bl
Pa

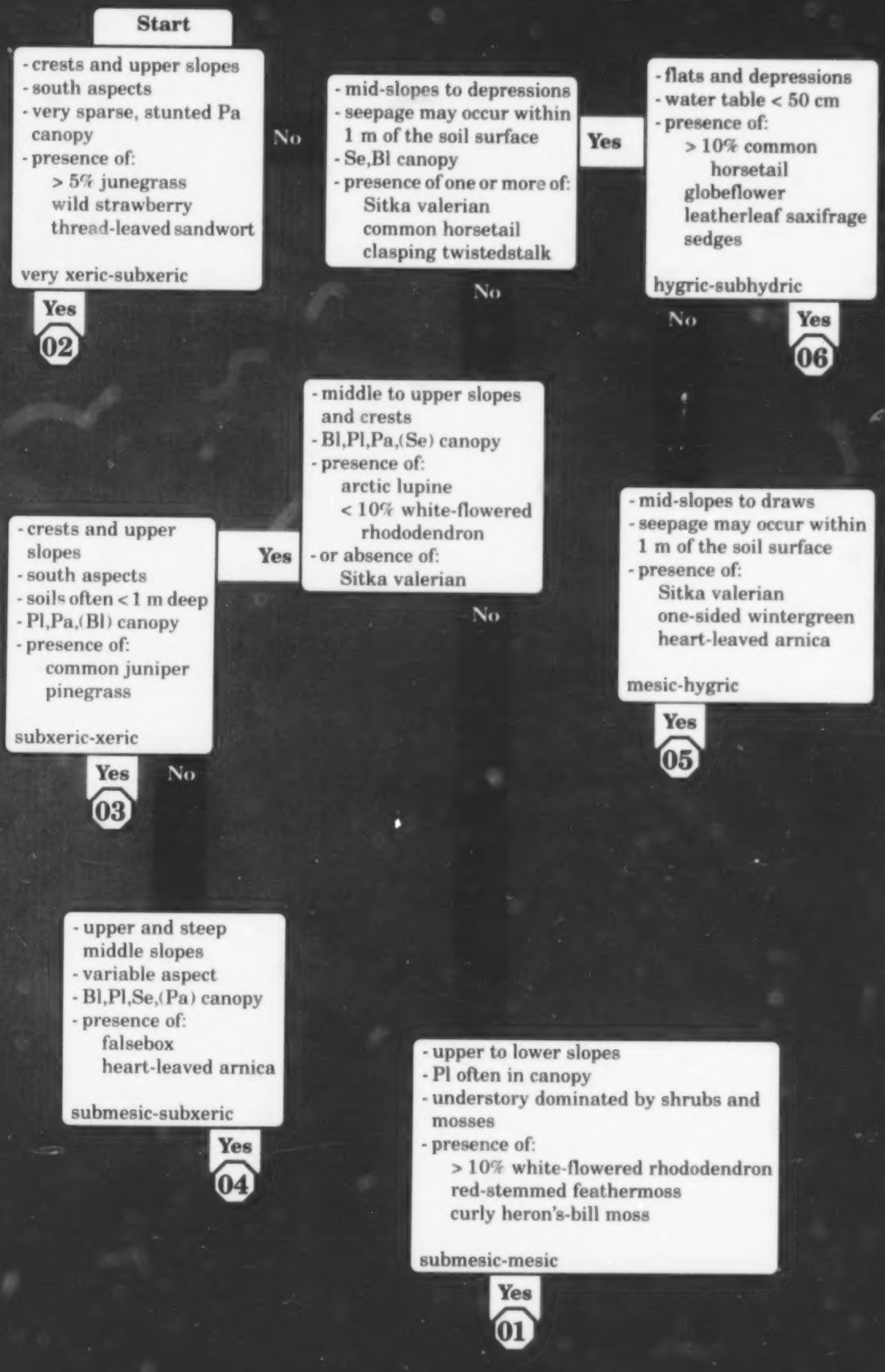
ESSF dv Vegetation Table

	Site Units	02	03	04	01	05	06	
Trees	*Pinus albicaulis*	▮	■■	■	▮			whitebark pine
	Pinus contorta		■	■■	▮			lodgepole pine
	Abies lasiocarpa		■	■■	■■■	■■■	■■	subalpine fir
	Picea engelmannii			▮	■■	■■	■■■	Engelmann spruce
Shrubs	*Juniperus communis*		■■					common juniper
	Paxistima myrsinites			■				falsebox
	Vaccinium membranaceum		■	■	■■	▮		black huckleberry
	Rhododendron albiflorum			▮	■■■	■	▮	white-flowered rhododendron
	Ribes lacustre							black gooseberry
Herbs	*Koeleria macrantha*	■■						junegrass
	Arctostaphylos uva-ursi	▮						kinnikinnick
	Arenaria capillaris	▮						thread-leaved sandwort
	Achillea millefolium	▮						yarrow
	Erigeron speciosus	▮						showy fleabane
	Fragaria virginiana	▮						wild strawberry
	Calamagrostis rubescens		▮					pinegrass
	Lupinus arcticus		■	■				arctic lupine
	Orthilia secunda			▮		▮		one-sided wintergreen
	Arnica cordifolia			▮		▮		heart-leaved arnica
	Arnica latifolia					▮	▮	mountain arnica
	Valeriana sitchensis					■	▮	Sitka valerian
	Equisetum arvense						■■■	common horsetail
	Carex spp.						▮	sedges
	Luzula hitchcockii						▮	smooth woodrush
	Streptopus amplexifolius						▮	clasping twistedstalk
	Trollius laxus						■	globeflower
	Leptarrhena pyrolifolia						■	leatherleaf saxifrage
Mosses, Lichens & Liverworts	*Peltigera aphthosa*		▮	▮	▮			lichen
	Brachythecium spp.			▮	▮	▮	▮	mosses
	Dicranum spp.		▮	▮	■■	▮		mosses
	Pleurozium schreberi				■■	▮		red-stemmed feathermoss
	Barbilophozia spp.			▮	■	■	■	liverworts
	Mnium spp.					▮	■■	leafy mosses

ESSF dv Environment Table

Site Units	02	03	04	01 **Zonal**	05	06
Soil Moisture Regime	VX-SX	SX-X	SM-SX	SM-M	M-HG	HG-SHD
Prevailing Successional Stage Sampled	Maturing Seral				Maturing Climax	
Aspect	South		All			N/A
Slope Gradient & Mesoslope Position	Gentle Upper & crest	Gentle - steep Upper & crest	Steep Middle - upper	Gentle - steep Upper - lower	Gentle steep Middle - lower	Flat Level & depression
Soil Texture Class	Fine	Variable				
Parent materials	Vv/Mv		Vv-Cv-Fv/Mb, Cb, Fb			Fb,Fv/Mb
Important Soil Features	Some L	L 25-100	--------		Some W	W 10-50

ESSF dv



- crests and upper slopes
- south aspects
- very sparse, stunted Pa canopy
- presence of:
  - > 5% junegrass
  - wild strawberry
  - thread-leaved sandwort

very xeric-subxeric

- mid-slopes to depressions
- seepage may occur within 1 m of the soil surface
- Se,Bl canopy
- presence of one or more of:
  - Sitka valerian
  - common horsetail
  - clasping twistedstalk

- flats and depressions
- water table < 50 cm
- presence of:
  - > 10% common horsetail
  - globeflower
  - leatherleaf saxifrage
  - sedges

hygric-subhydric

- middle to upper slopes and crests
- Bl,Pl,Pa,(Se) canopy
- presence of:
  - arctic lupine
  - < 10% white-flowered rhododendron
- or absence of:
  - Sitka valerian

- crests and upper slopes
- south aspects
- soils often < 1 m deep
- Pl,Pa,(Bl) canopy
- presence of:
  - common juniper
  - pinegrass

subxeric-xeric

- mid-slopes to draws
- seepage may occur within 1 m of the soil surface
- presence of:
  - Sitka valerian
  - one-sided wintergreen
  - heart-leaved arnica

mesic-hygric

- upper and steep middle slopes
- variable aspect
- Bl,Pl,Se,(Pa) canopy
- presence of:
  - falsebox
  - heart-leaved arnica

submesic-subxeric

- upper to lower slopes
- Pl often in canopy
- understory dominated by shrubs and mosses
- presence of:
  - > 10% white-flowered rhododendron
  - red-stemmed feathermoss
  - curly heron's-bill moss

submesic-mesic

MOIST WARM ENGELMANN SPRUCE – SUBALPINE FIR SUBZONE

Distribution: The ESSFmw occurs along the western boundary of the KFR, on the lee side of the Coast and Cascade mountains from the U.S. border to the Cariboo Forest Region. It includes the upper slopes of the Hurley, Cadwallader, Gates, Stein, Cayoosh and Kwoiek watersheds. It occurs above either the CWHms, CWHds or an undifferentiated MS subzone, and below the AT.

Elevational Range (Mean): 1275-1675 m

Climate: The ESSF zone is characterized by long, cold winters with a high snowcover and short, cool summers. The ESSFmw is the warmest ESSF subzone in the KFR. The temperature regime is moderated by its proximity to the Pacific Ocean. This contributes to high winter precipitation and, therefore, deep snow packs.

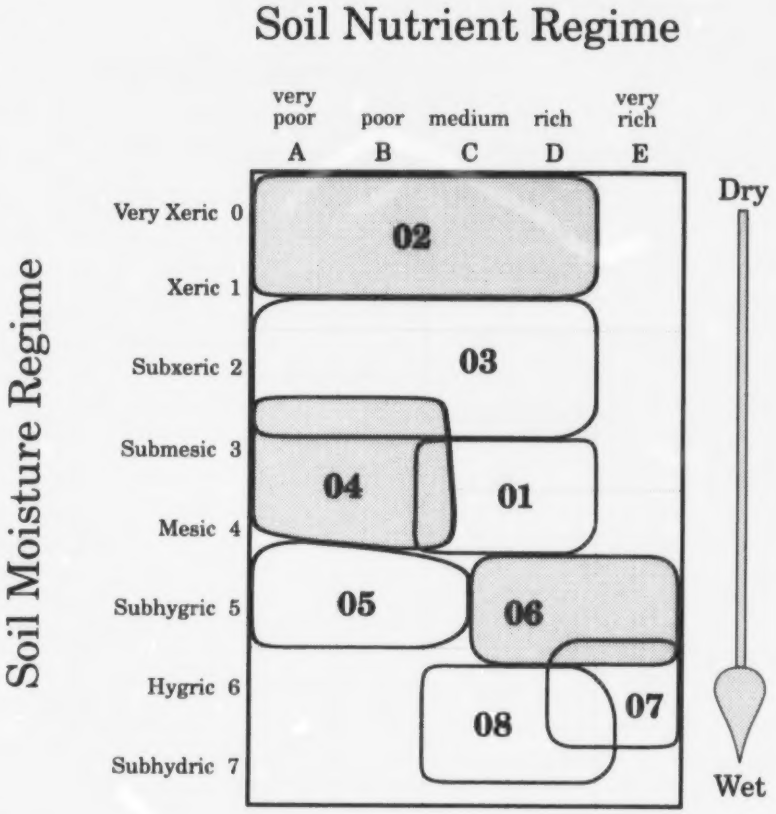
Vegetation and Soils

Zonal Sites: Bl, Se, varying amounts of Ba, and the occasional Hm form dense, mature climax stands. The shrubby understory contains black huckleberry and white-flowered rhododendron. A poorly developed herb layer includes one-sided wintergreen and, frequently, five-leaved bramble. Pipecleaner moss and, sometimes, red-stemmed feathermoss are scattered. Humo-Ferric Podzols are the common soils.

Dry Sites: Open, mature seral stands of Pl dominate these sites. Bl and minor amounts of Se are also present. The understory is open, with black huckleberry and common juniper dominating. The herb layer is poorly developed, but *Rhacomitrium* spp. and lichens commonly occur.

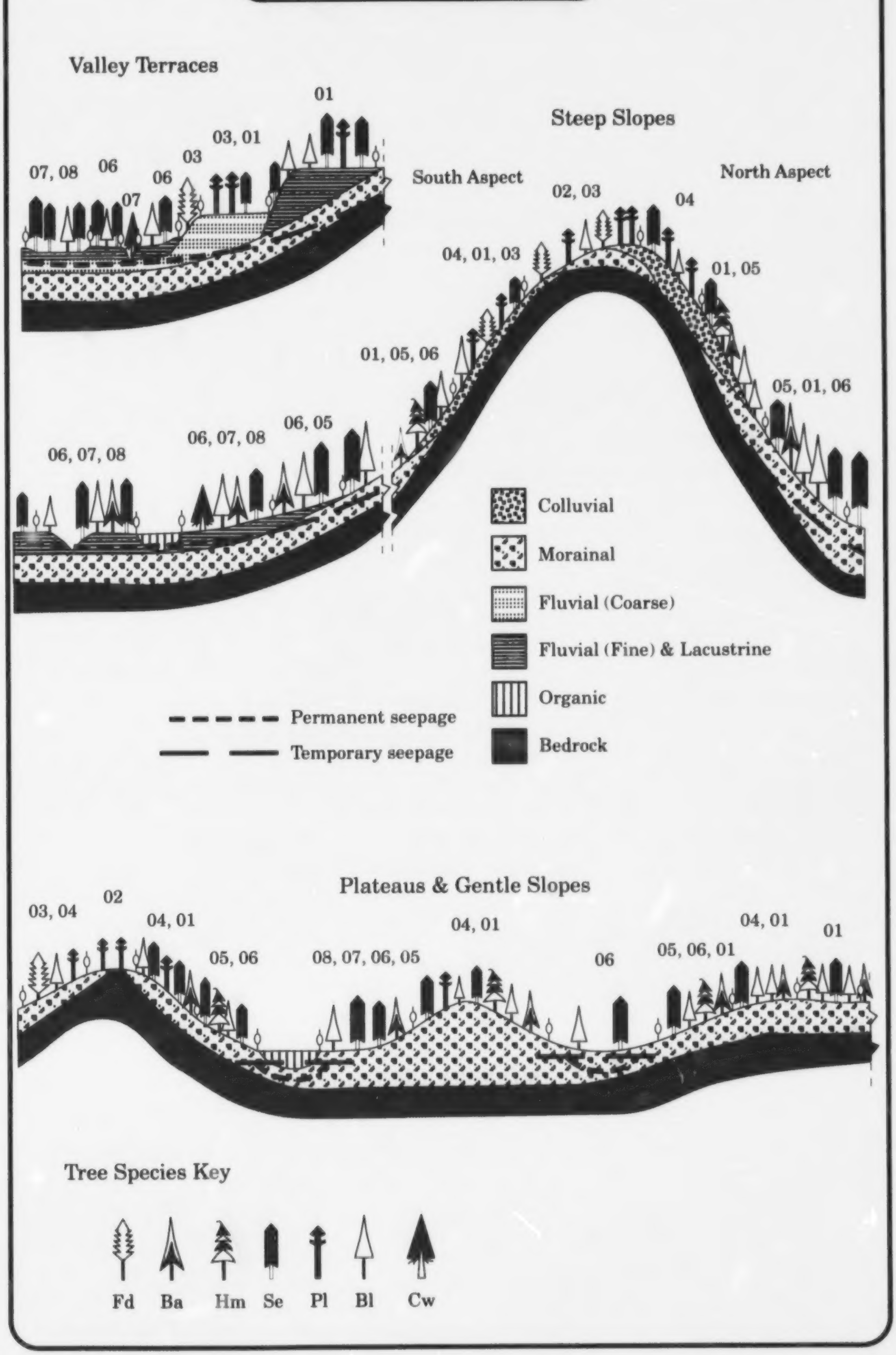
Wet Sites: Climax stands are characterized by Bl and Se, with minor amounts of Ba. Cw and Hw occur at lower elevations. The mixed shrub-herb understory contains five-leaved bramble, Sitka valerian, one-leaved foamflower, black huckleberry and black gooseberry. Oak fern and horsetails occur on wetter sites. Bryophytes are sparse.

BGC Features: The presence of white-flowered rhododendron and Sitka valerian distinguishes the ESSF from other zones. The occurrence of Ba distinguishes the ESSFmw from other ESSF subzones in the KFR.



02	BlPl — Juniper — Rhacomitrium
03	Fd — Falsebox — Pinegrass
04	Bl — Huckleberry — Falsebox
Zonal 01	BlBa — Rhododendron
05	BlBa — Azalea — Pipecleaner moss
06	Bl — Gooseberry — Valerian
07	BlBa — Oak fern — Lady fern
08	Bl — Gooseberry — Horsetail

ESSF mw


Valley Terraces
01
03, 01
03
07, 08
06
06
07
Steep Slopes
South Aspect
North Aspect
02, 03
04
04, 01, 03
01, 05
01, 05, 06
05, 01, 06
06, 07, 08
06, 07, 08
06, 05
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 04
02
04, 01
05, 06
08, 07, 06, 05
04, 01
06
05, 06, 01
04, 01
01
Tree Species Key
Fd
Ba
Hm
Se
Pl
Bl
Cw

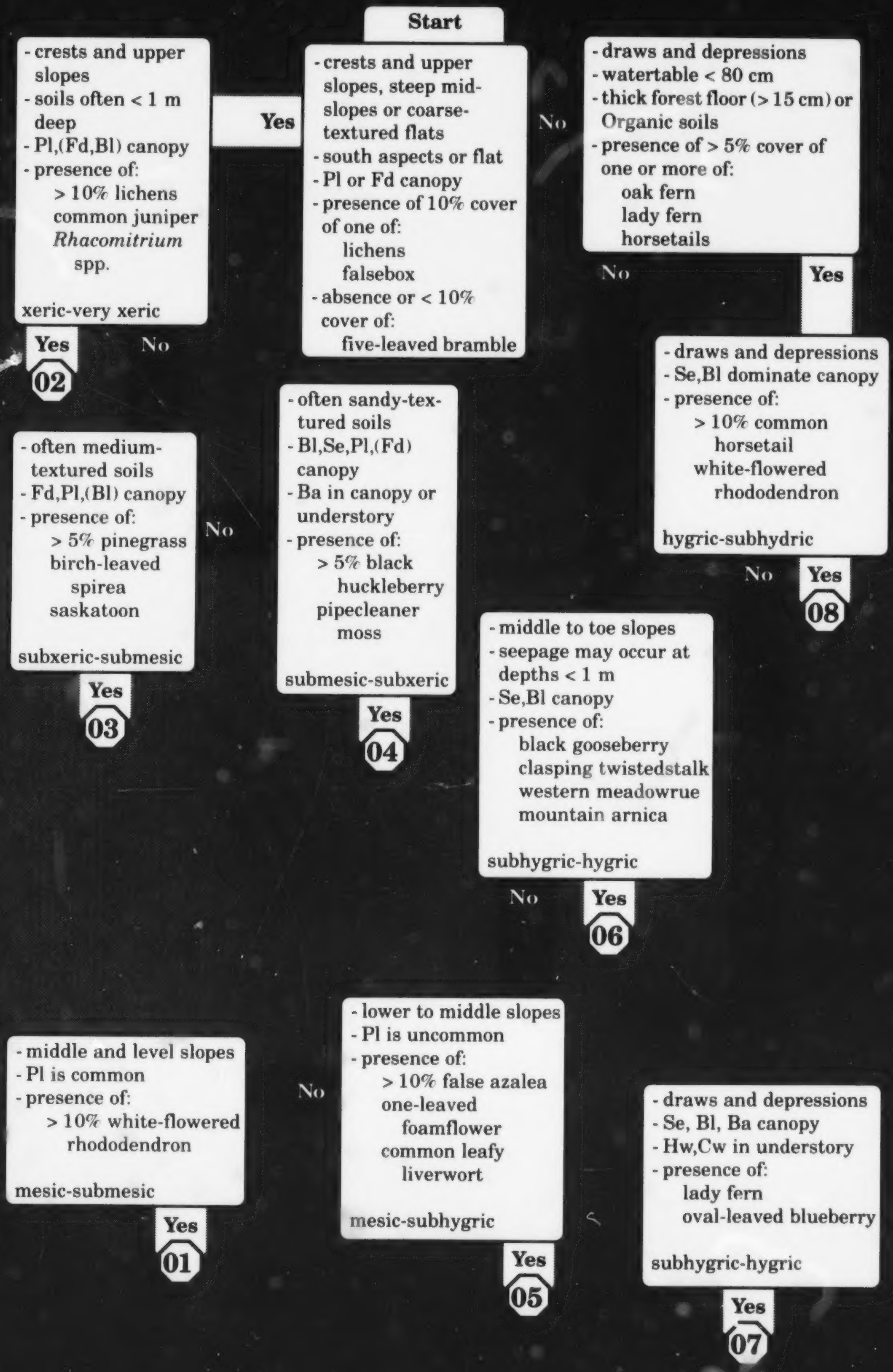
ESSF mw Vegetation Table

	Site Units	02	03	04	01	05	06	07	08	
Trees	*Pseudotsuga menziesii* var. *glauca*	▪	■■■	▪						interior Douglas-fir
	Pinus contorta	■■■	■■	■■	▪	▪				lodgepole pine
	Abies lasiocarpa	■■■	■	■■■	■■■	■■■	■■■	■■■	■■	subalpine fir
	Picea engelmannii	▪	▪	■■	■■	■■■	■■■	■■■	■■■	Engelmann spruce
	Abies amabilis			■■	■■	■■	▪	■■■	▪	amabilis fir
	Thuja plicata							■		western redcedar
	Tsuga heterophylla							■		western hemlock
Shrubs	*Juniperus communis*	■								common juniper
	Amelanchier alnifolia		▪							saskatoon
	Spiraea betulifolia		■							birch-leaved spirea
	Paxistima myrsinites	▪	■■■	■■						falsebox
	Vaccinium membranaceum	■■		■■■	■■	■■■	■■	■■	■	black huckleberry
	Rhododendron albiflorum				■■		▪		■	white-flowered rhododendron
	Menziesia ferruginea					■■■		■■	▪	false azalea
	Ribes lacustre						▪	▪	■■	black gooseberry
	Vaccinium ovalifolium				▪			▪		oval-leaved blueberry
Herbs	*Calamagrostis rubescens*		■■							pinegrass
	Aster conspicuus		▪							showy aster
	Chimaphila umbellata		▪	▪						prince's pine
	Orthilia secunda		▪	▪	▪	▪	▪		▪	one-sided wintergreen
	Rubus pedatus				▪	■	■	■■	■■	five-leaved bramble
	Valeriana sitchensis				▪		■■	■■	■■	Sitka valerian
	Tiarella unifoliata					▪	■	▪	▪	one-leaved foamflower
	Streptopus roseus					▪	▪	■	■	rosy twistedstalk
	Clintonia uniflora					▪	▪	▪		queen's cup
	Cornus canadensis						▪	■	▪	bunchberry
	Thalictrum occidentale						▪			western meadowrue
	Arnica latifolia						■			mountain arnica
	Athyrium filix-femina							■		lady fern
	Gymnocarpium dryopteris							■■■	■■	oak fern
	Streptopus amplexifolius							▪	▪	clasping twistedstalk
	Equisetum spp.							▪	■■■	horsetails
	Leptarrhena pyrolifolia								▪	leatherleaf saxifrage
Mosses, Lichens & Liverworts	*Polytrichum juniperinum*	▪								juniper haircap moss
	Cladonia spp.	■■■								lichens
	Rhacomitrium spp.	■■■		▪						mosses
	Pleurozium schreberi			▪	■	▪				red-stemmed feathermoss
	Barbilophozia lycopodioides					■				common leafy liverwort
	Rhytidiopsis robusta			■■	■	■■	▪			pipecleaner moss

ESSF mw Environment Table

Site Units	02	03	04	01 Zonal	05	06	07	08
Soil Moisture Regime	X-VX	SX-SM	SX-M	M-SM	M-SHG	SHG-HG	SHG-HG	HG-SHD
Prevailing Successional Stage Sampled	Maturing Seral			Maturing Climax				
Aspect	South			All			N/A	
Slope Gradient & Mesoslope Position	Gentle Upper & crest	Steep Middle - upper	Gentle - steep Middle - upper	Gentle - steep Middle & level	Gentle - steep Middle - lower	Gentle - flat Mid.-low. & level	Flat Level & depression	
Soil Texture Class	Coarse	Medium	Coarse	Variable	Medium	Variable		
Parent Materials	Mv,Cv/Mb	Cv/Mb,Cb	Mb,Cv/Mb	Mb,Cb	Mb	Mb,Fb,Ff	Fb,Fv/Mb	Ov,Fv/Mb
Important Soil Features	Some L		--------			W 30-100	W 10-80	W 10-50

ESSF mw



- crests and upper slopes, steep mid-slopes or coarse-textured flats
- south aspects or flat
- Pl or Fd canopy
- presence of 10% cover of one of:
    - lichens
    - falsebox
- absence or < 10% cover of:
    - five-leaved bramble

- crests and upper slopes
- soils often < 1 m deep
- Pl,(Fd,Bl) canopy
- presence of:
    - > 10% lichens
    - common juniper
    - *Rhacomitrium* spp.

xeric-very xeric

- draws and depressions
- watertable < 80 cm
- thick forest floor (> 15 cm) or Organic soils
- presence of > 5% cover of one or more of:
    - oak fern
    - lady fern
    - horsetails

- often medium-textured soils
- Fd,Pl,(Bl) canopy
- presence of:
    - > 5% pinegrass
    - birch-leaved spirea
    - saskatoon

subxeric-submesic

- often sandy-textured soils
- Bl,Se,Pl,(Fd) canopy
- Ba in canopy or understory
- presence of:
    - > 5% black huckleberry
    - pipecleaner moss

submesic-subxeric

- draws and depressions
- Se,Bl dominate canopy
- presence of:
    - > 10% common horsetail
    - white-flowered rhododendron

hygric-subhydric

- middle to toe slopes
- seepage may occur at depths < 1 m
- Se,Bl canopy
- presence of:
    - black gooseberry
    - clasping twistedstalk
    - western meadowrue
    - mountain arnica

subhygric-hygric

- middle and level slopes
- Pl is common
- presence of:
    - > 10% white-flowered rhododendron

mesic-submesic

- lower to middle slopes
- Pl is uncommon
- presence of:
    - > 10% false azalea
    - one-leaved foamflower
    - common leafy liverwort

mesic-subhygric

- draws and depressions
- Se, Bl, Ba canopy
- Hw,Cw in understory
- presence of:
    - lady fern
    - oval-leaved blueberry

subhygric-hygric

VERY WET COLD ENGELMANN SPRUCE – SUBALPINE FIR SUBZONE

Distribution: The ESSFvc lies on the west side of the Monashee Mountains from the upper Seymour River to south of Revelstoke, including the upper Perry River and the north slopes of the Eagle River. It occurs above the ICHvk1 and ICHwk1 and below the ESSFvv.

Elevational Range (Mean): 1280-1620 m

Climate: Long, cold winters with a high snowcover and short, cool summers characterize the ESSF zone. The ESSFvc is one of the wettest subzones in the KFR. It is wetter than the ESSFxc, dc, dv and wc2, colder than the ESSFmw, and warmer than the ESSFvv.

Vegetation and Soils

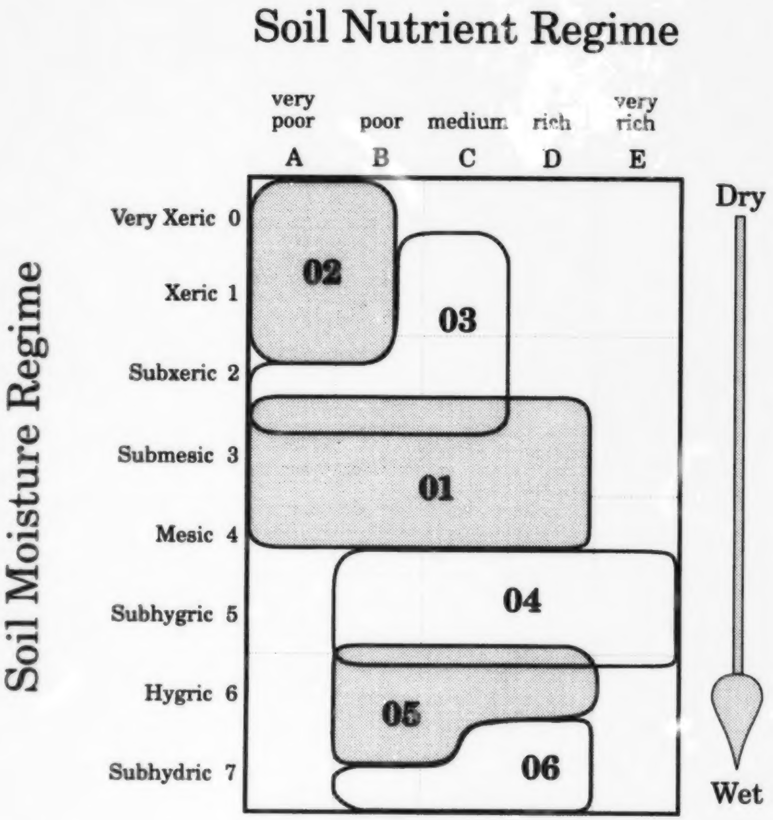
Zonal Sites: Climax stands are composed of Se, Bl and Hm. These sites are shrubby and consist of black huckleberry, white-flowered rhododendron, oval-leaved blueberry and, frequently, false azalea. They also have a rich, diverse herb layer containing oak fern, five-leaved bramble, one-leaved foamflower and rosy twistedstalk. The moss layer is generally dense, with leafy mosses and the liverworts *Barbilophozia* spp. Common soils are Humo-Ferric Podzols, Ferro-Humic Podzols, Dystric and Sombric Brunisols.

Dry Sites: Hm dominates in dense, mature climax stands containing various amounts of Bl and Se. The understory consists mainly of black huckleberry and white-flowered rhododendron with a moderate moss cover. The herb layer is sparse.

Wet Sites: The canopy is characterized by Bl, Se and Hm. The shrub cover is low except on seepage sites, where devil's club, false azalea and oval-leaved blueberry dominate. The rich herb layer contains Sitka valerian and lady, oak and spiny wood ferns. The common mosses are *Brachythecium* spp. Sedges, arrow-leaved groundsel and/or horsetails, and a well-developed moss layer occupy wetter sites.

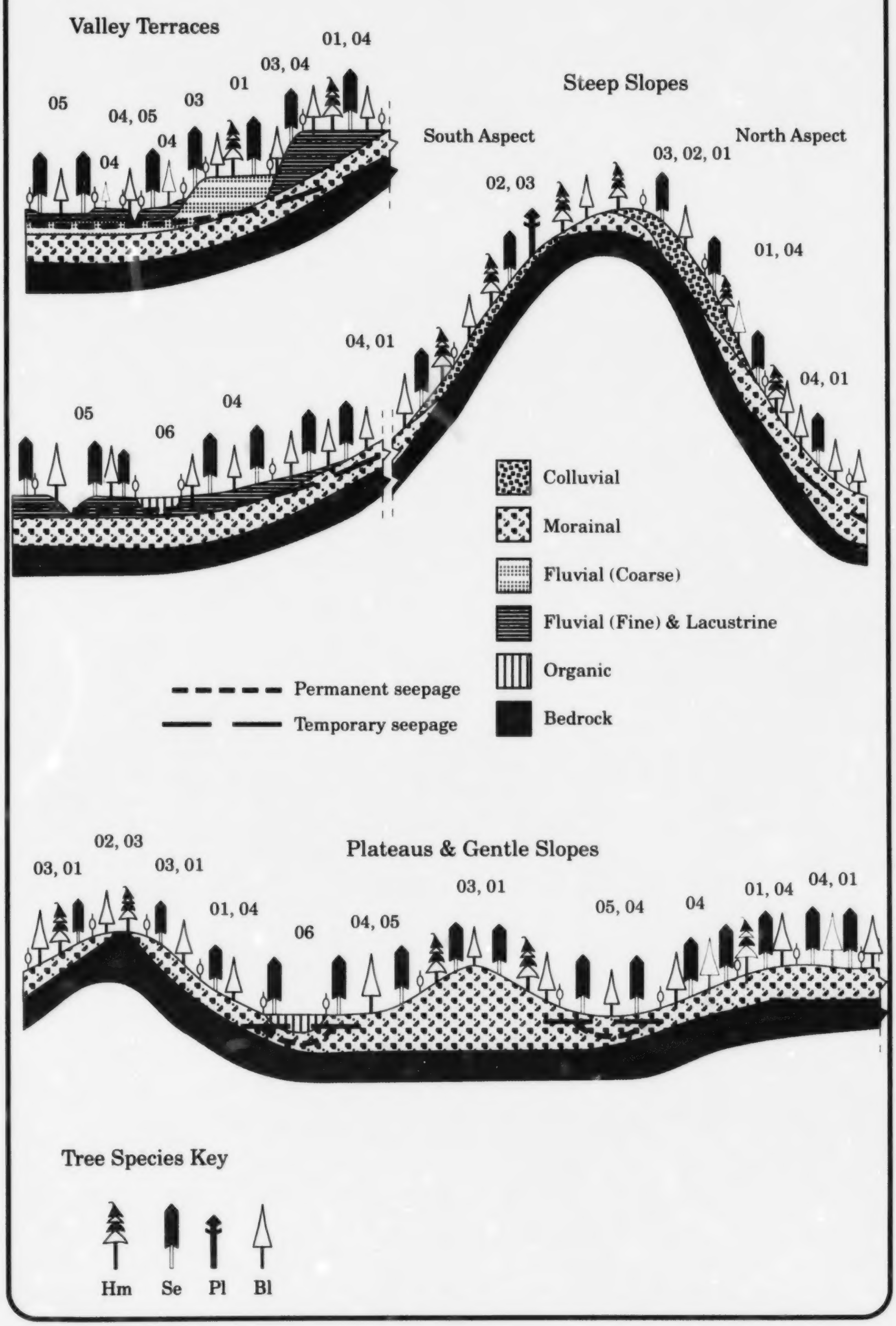
BGC Features: The presence of white-flowered rhododendron and Sitka valerian distinguishes the ESSF from other zones. The ESSFvc is distinguished from all other ESSF units in the KFR, except the ESSFmw, by the presence of Hm, false azalea, oak fern and rosy twistedstalk. The ESSFvc lacks Ba, which is common in the ESSFmw.

Comments: Most of the ESSFvc occurs in the Nelson Forest Region. The area mapped as ESSFvc contains a narrow band of the ESSFvv, above 1620 m, which has not been delineated, because of mapping limitations.



02	BlHm — Rhododendron — Leafy liverwort
03	BlHm — Rhododendron — Pipecleaner moss
Zonal 01	BlHm — Rhododendron — Oak fern
04	BlHm — Devil's club — Lady fern
05	BlHm — Horsetail
06	Sedge — Sphagnum

ESSF vc


Valley Terraces
05
04, 05
04
04
03
01
03, 04
01, 04
Steep Slopes
South Aspect
North Aspect
02, 03
03, 02, 01
01, 04
04, 01
04, 01
05
06
04
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 01
02, 03
03, 01
01, 04
06
04, 05
03, 01
05, 04
04
01, 04
04, 01
Tree Species Key
Hm
Se
Pl
Bl

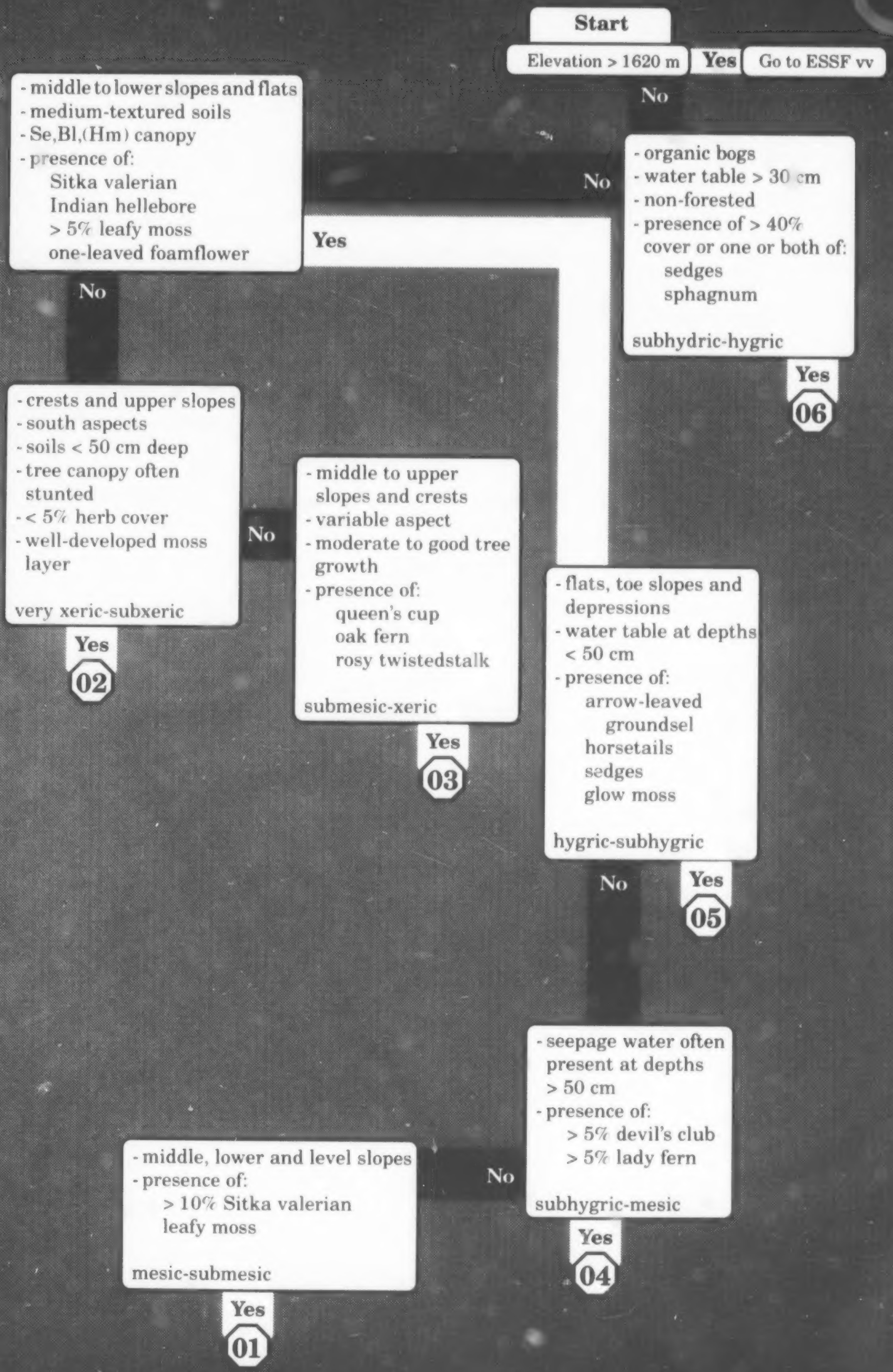
ESSF vc Vegetation Table

	Site Units	02	03	01	04	05	06	
Trees	*Tsuga mertensiana*	▬	▬	▮	■	■		mountain hemlock
	Abies lasiocarpa	■	▬	■	▬	■		subalpine fir
	Picea engelmannii	■	■	■	▬	■		Engelmann spruce
Shrubs	*Vaccinium membranaceum*	■	■	■	■	▮	▮	black huckleberry
	Rhododendron albiflorum	■	■	■	▮	▮		white-flowered rhododendron
	Vaccinium ovalifolium		▮	■	■	▮		oval-leaved blueberry
	Menziesia ferruginea			▮	■			false azalea
	Oplopanax horridus				■			devil's club
Herbs	*Clintonia uniflora*		▮					queen's cup
	Rubus pedatus	▮	■	■	▮			five-leaved bramble
	Gymnocarpium dryopteris		▮	■	■	▮		oak fern
	Streptopus roseus		▮	▮	▮	▮		rosy twistedstalk
	Valeriana sitchensis			■	■	■		Sitka valerian
	Tiarella unifoliata			■	■	▮		one-leaved foamflower
	Dryopteris assimilis			▮	■			spiny wood fern
	Athyrium filix-femina			▮	▬	▮		lady fern
	Veratrum viride			▮		▮		Indian hellebore
	Streptopus amplexifolius					▮		clasping twistedstalk
	Equisetum arvense					■		common horsetail
	Senecio triangularis					■	■	arrow-leaved groundsel
	Carex spp.					■	▬	sedges
	Trollius laxus						▮	globeflower
Mosses, Lichens & Liverworts	*Cladonia* spp.	▮						lichens
	Dicranum spp.	▬	▮	■				mosses
	Barbilophozia spp.	▬	■	■	▮	▮		liverworts
	Pleurozium schreberi	▮	▮	▮	▮	▮		red-stemmed feathermoss
	Rhytidiopsis robusta		■		▮			pipecleaner moss
	Brachythecium spp.		■	■	■	■		mosses
	Mnium spp.			▮		■		leafy mosses
	Aulacomnium palustre					■		glow moss
	Sphagnum spp.					■	▬	sphagnums

ESSF vc Environment Table

Site Units	02	03	01	04	05	06
			Zonal			
Soil Moisture Regime	VX-SX	SM-X	M-SX	SHG-M	HG-SHG	SHD-HG
Prevailing Successional Stage Sampled	Maturing Climax					
Aspect	South	All			N/A	
Slope Gradient & Mesoslope Position	Steep - gentle Upper & crest	Steep - gentle Mid.-upp. & crest	Gentle - steep Mid.-low. & level	Gentle - steep Middle - lower	Gentle Low.-level & depress.	Flat Level & depression
Soil Texture Class	Variable		Medium			Organic
Parent Materials	Mv,Cv,Ov	Mb,Cv/Mb	Mb	Mb,Fv/Mb	Fb,Fv/Mb	Ob,Ov/Fb
Important Soil Features	L 5-50	L > 60	--------	Minor W	W 25-50	W 2-30

ESSF vc


Start
Elevation > 1620 m
Yes
Go to ESSF vv
No
- organic bogs
- water table > 30 cm
- non-forested
- presence of > 40% cover or one or both of:
sedges
sphagnum
subhydric-hygric
Yes
06
No
- middle to lower slopes and flats
- medium-textured soils
- Se,Bl,(Hm) canopy
- presence of:
Sitka valerian
Indian hellebore
> 5% leafy moss
one-leaved foamflower
Yes
No
- crests and upper slopes
- south aspects
- soils < 50 cm deep
- tree canopy often stunted
- < 5% herb cover
- well-developed moss layer
very xeric-subxeric
Yes
02
No
- middle to upper slopes and crests
- variable aspect
- moderate to good tree growth
- presence of:
queen's cup
oak fern
rosy twistedstalk
submesic-xeric
Yes
03
- flats, toe slopes and depressions
- water table at depths < 50 cm
- presence of:
arrow-leaved groundsel
horsetails
sedges
glow moss
hygric-subhygric
No
Yes
05
- seepage water often present at depths > 50 cm
- presence of:
> 5% devil's club
> 5% lady fern
subhygric-mesic
Yes
04
No
- middle, lower and level slopes
- presence of:
> 10% Sitka valerian
leafy moss
mesic-submesic
Yes
01

VERY WET VERY COLD
ENGELMANN SPRUCE – SUBALPINE FIR SUBZONE

Distribution: The ESSFvv occupies an elevational band above the ESSFwc2 and ESSFvc on the Monashee and Cariboo ranges from east of Lumby to the north end of the KFR.

Elevational Range (Mean): 1640-1890 m

Climate: The ESSF zone is characterized by long, cold winters with a high snowcover and short, cool summers. The ESSFvv is the coldest and wettest subzone in the Kamloops Forest Region.

Vegetation and Soils

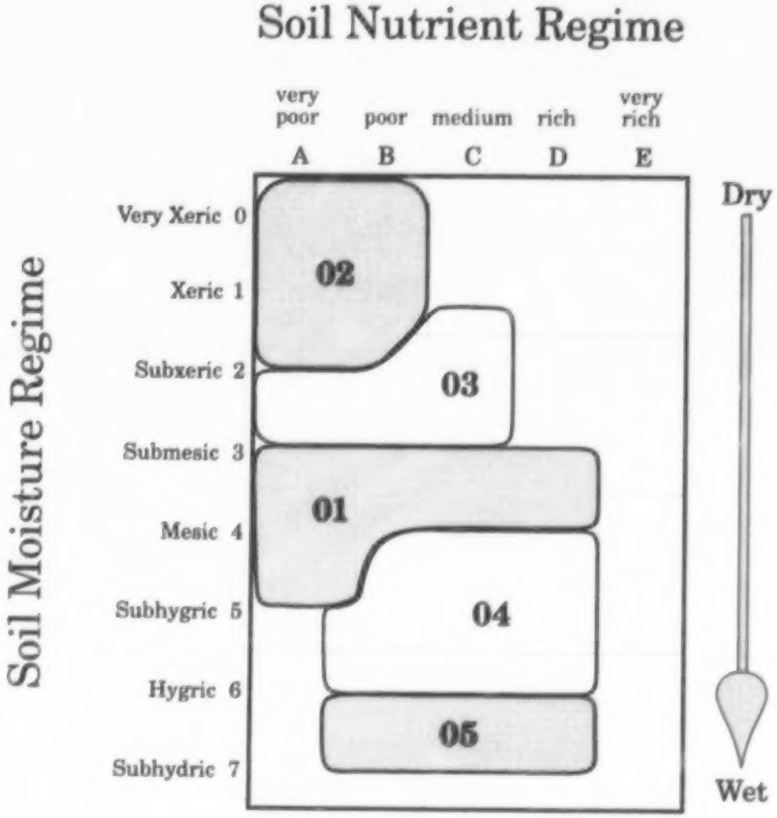
Zonal Sites: Open climax stands of Bl occur, with minor amounts of Se. The understory is shrubby, consisting of black huckleberry and varying amounts of white-flowered rhododendron. Sitka valerian is the dominant herb, with lesser amounts of mountain arnica. Bryophytes are varied and scattered. Common soils are Humo-Ferric Podzols, Ferro-Humic Podzols, Dystric Brunisols and Sombric Brunisols.

Dry Sites: These sites are characterized by scattered Bl, with an open understory containing black huckleberry and *Dicranum* mosses. Mountain-heathers and partridgefoot may be present.

Wet Sites: The open tree canopy contains Bl, with minor amounts of Se at climax. A dense herb layer dominates the understory. Sitka valerian is abundant, with lesser amounts of mountain arnica, arrow-leaved groundsel and globeflower. Bryophytes are generally sparse.

BGC Features: The presence of white-flowered rhododendron and Sitka valerian distinguishes the ESSF from other zones. The ESSFvv is distinguished from the adjacent lower-elevation ESSFvc and ESSFwc2 by the lack of false azalea, oak fern, devil's club and lady fern. It also has partridgefoot and mountain-heathers on azonal sites.

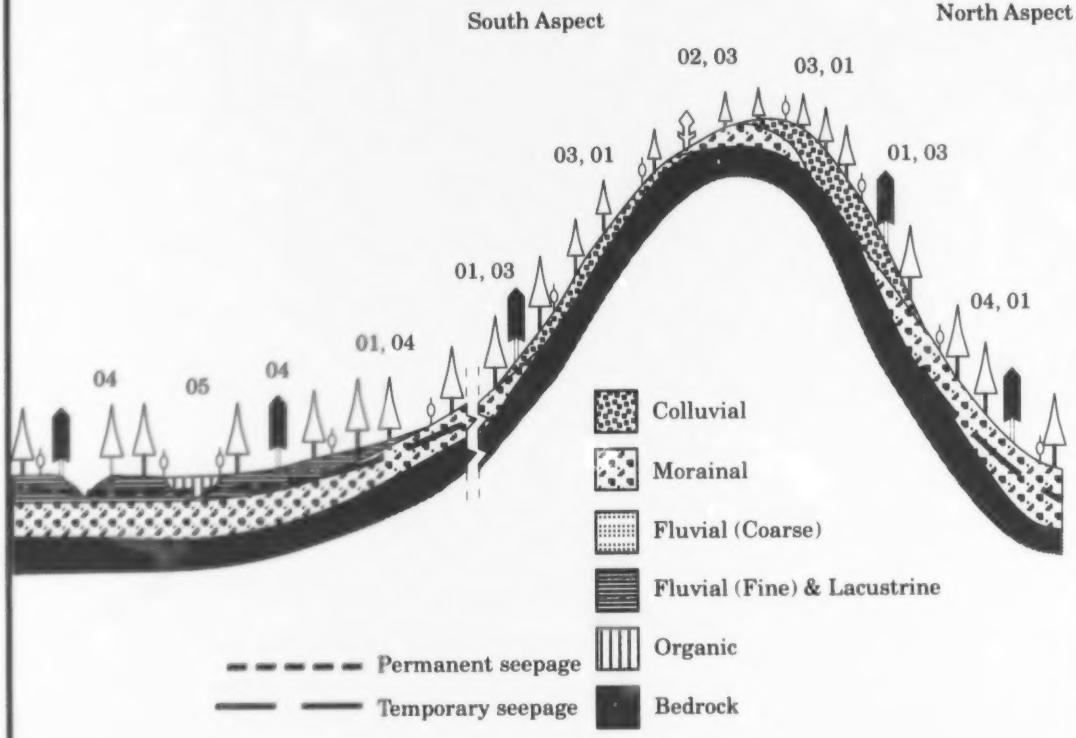
Comments: The ESSFvv occupies a narrow elevational band starting at approximately 1620-1650 m in areas mapped as ESSFwc2 and ESSFvc. However, it is not delineated, because of mapping limitations. Sampling in this subzone was limited, but it is recognized because of its importance to wildlife and forest management.



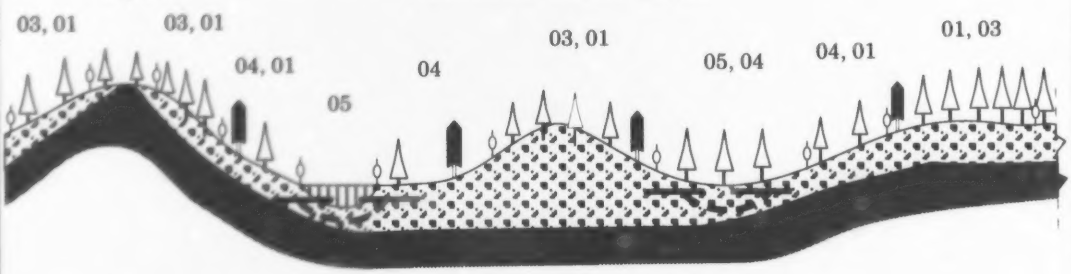
02	Bl — Huckleberry — Mountain liverwort
03	BlHm — Rhododendron — Mountain liverwort
Zonal 01	Bl — Rhododendron — Foamflower
04	Bl — Valerian — Groundsel
05	Mountain-heather — Alpine sedge

ESSF vv

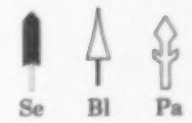
Steep Slopes



Plateaus & Gentle Slopes



Tree Species Key



Note: Sampling in this subzone is incomplete.

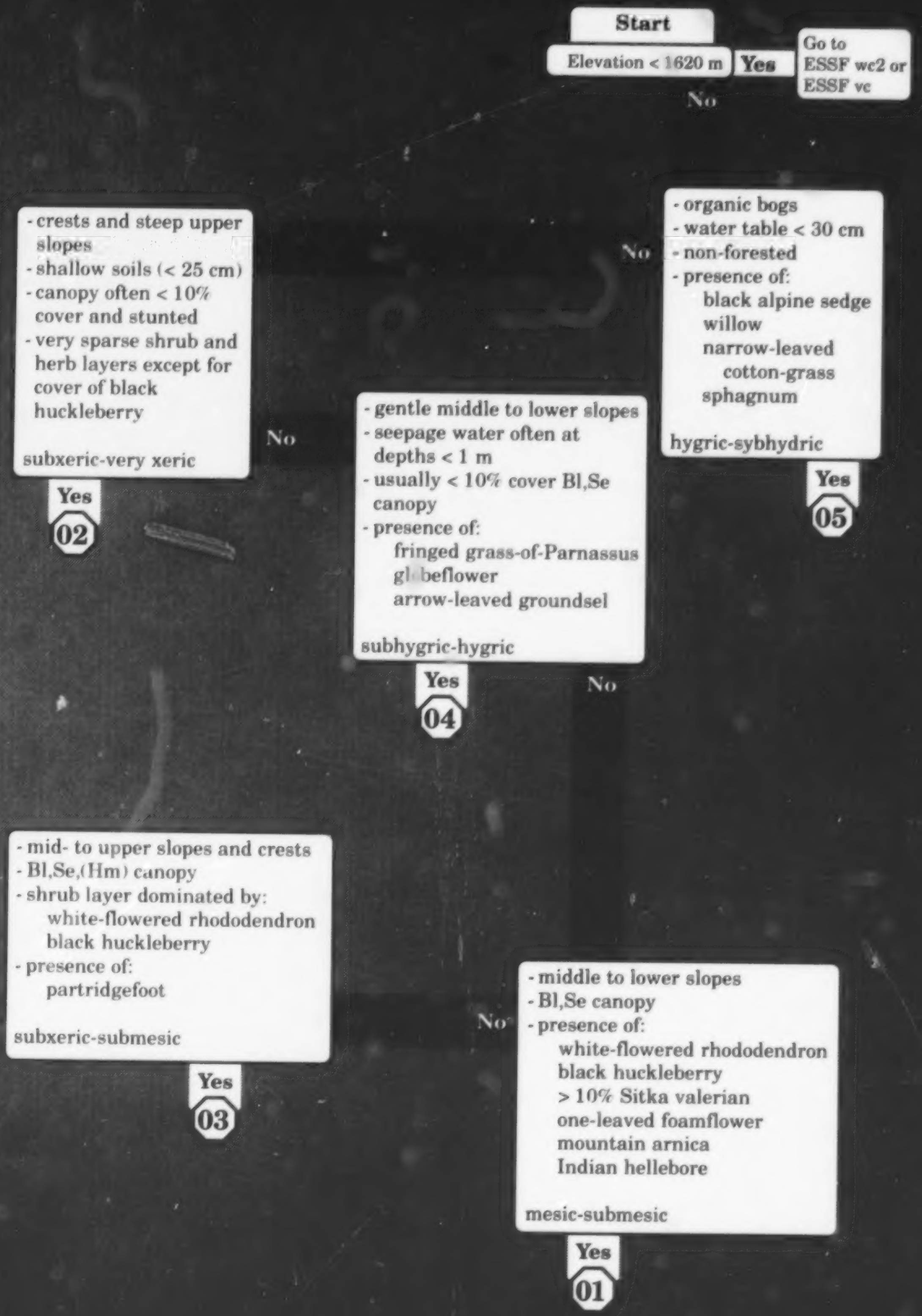
ESSF vv Vegetation Table

	Site Units	02	03	01	04	05	
Trees	*Abies lasiocarpa*	■	█	█	■		subalpine fir
	Picea engelmannii		▪	■	▪		Engelmann spruce
Shrubs	*Vaccinium membranaceum*	■	■	█	▪		black huckleberry
	Rhododendron albiflorum		█	█			white-flowered rhododendron
	Salix spp.					■	willows
Herbs	*Saxifraga ferruginea*	▪					Alaska saxifrage
	Rubus pedatus		▪				five-leaved bramble
	Luetkea pectinata	▪	■			▪	partridgefoot
	Streptopus roseus			▪			rosy twistedstalk
	Tiarella unifoliata			▪			one-leaved foamflower
	Valeriana sitchensis			■	█		Sitka valerian
	Arnica latifolia			■	■		mountain arnica
	Mitella breweri			▪	▪		Brewer's mitrewort
	Vahlodea atropurpurea			▪	▪		mountain hairgrass
	Veratrum viride			▪	▪		Indian hellebore
	Pedicularis bracteosa				▪		bracted lousewort
	Parnassia fimbriata				▪		fringed grass-of-Parnassus
	Senecio triangularis				■		arrow-leaved groundsel
	Trollius laxus				■		globeflower
	Kalmia microphylla					▪	alpine bog-laurel
	Cassiope mertensiana					■	white mountain-heather
	Sanguisorba canadensis					■	Sitka burnet
	Eriophorum angustifolium					■	narrow-leaved cotton-grass
	Carex nigricans					█	black alpine sedge
Mosses, Lichens & Liverworts	*Cladonia* spp.	▪				▪	lichens
	Rhacomitrium spp.	▪					mosses
	Dicranum spp.	█	▪				mosses
	Barbilophozia floerkei	■	■	■			mountain liverwort
	Barbilophozia lycopodioides		■				common leafy liverwort
	Brachythecium spp.			▪			mosses
	Drepanocladus spp.				▪		mosses
	Sphagnum spp.					■	sphagnums
	Aulacomnium palustre					■	glow moss

ESSF vv Environment Table

Site Units	02	03	01 Zonal	04	05
Soil Moisture Regime	VX-SX	SX-SM	M-SM	SHG-HG	HG-SHD
Prevailing Successional Stage Sampled	Maturing Climax				
Aspect	All				N/A
Slope Gradient & Mesoslope Position	Steep - gentle Upper & crest	Steep - gentle Upp.-mid. & crest	Steep - gentle Middle - lower	Gentle Middle - lower	Flat Level & depression
Soil Texture Class	Variable		Medium		Variable
Parent Materials	Mv,(Cv)	Mb,Cv/Mb			Mb,Ov/Fb
Important Soil Features	L 5-25	--------		Minor W	W 20-60

ESSF vv



- crests and steep upper slopes
- shallow soils (< 25 cm)
- canopy often < 10% cover and stunted
- very sparse shrub and herb layers except for cover of black huckleberry

subxeric-very xeric

- organic bogs
- water table < 30 cm
- non-forested
- presence of:
  - black alpine sedge
  - willow
  - narrow-leaved cotton-grass
  - sphagnum

hygric-sybhydric

- gentle middle to lower slopes
- seepage water often at depths < 1 m
- usually < 10% cover Bl,Se canopy
- presence of:
  - fringed grass-of-Parnassus
  - globeflower
  - arrow-leaved groundsel

subhygric-hygric

- mid- to upper slopes and crests
- Bl,Se,(Hm) canopy
- shrub layer dominated by:
  - white-flowered rhododendron
  - black huckleberry
- presence of:
  - partridgefoot

subxeric-submesic

- middle to lower slopes
- Bl,Se canopy
- presence of:
  - white-flowered rhododendron
  - black huckleberry
  - > 10% Sitka valerian
  - one-leaved foamflower
  - mountain arnica
  - Indian hellebore

mesic-submesic

ESSF wc2

NORTHERN MONASHEE WET COLD ENGELMANN SPRUCE – SUBALPINE FIR VARIANT

Distribution: The ESSFwc2 is the most extensive ESSF unit in the KFR. The ESSFwc2 occupies the upper slopes of the Monashee Mountains and Shuswap Highlands from Adams Lake to the eastern Regional Boundary. It occurs above the ICHmw, ICHwk1, and ICHvk1 and below the ESSFvv.

Elevational Range (Mean): 1400-1700 m

Climate: The ESSF zone is characterized by long, cold winters with a high snowcover and short, cool summers. The ESSFwc2 is moister than the ESSFxc, ESSFdc and ESSFdv, but drier than the ESSFvc. Growing season moisture deficits are rare due to late snow melt and frequent summer storms.

Vegetation and Soils

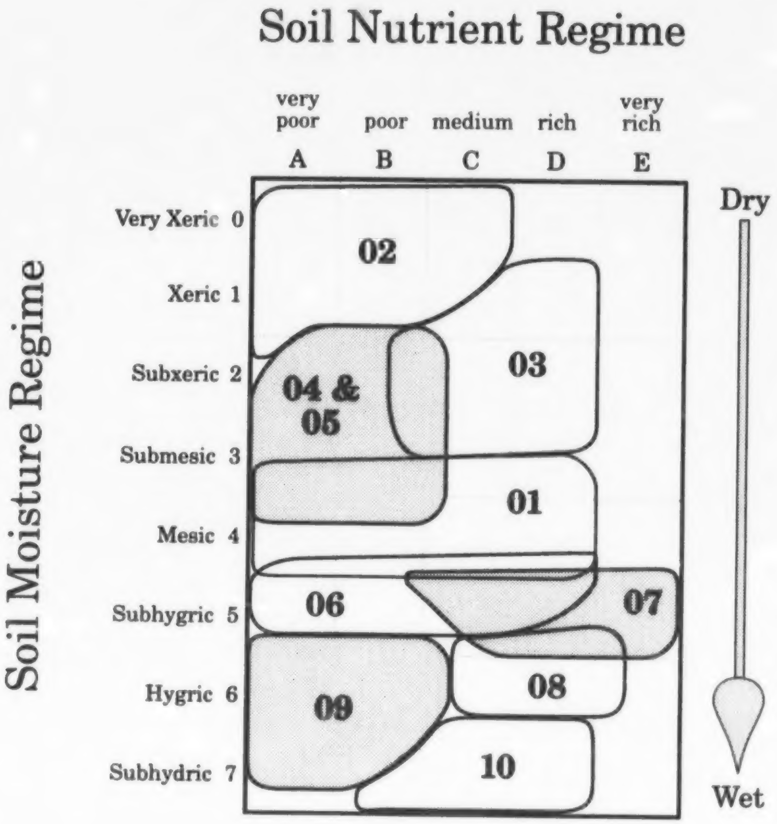
Zonal Sites: Mature open climax stands of Bl and Se dominate the landscape; successional stands are rare. The shrubby understory contains white-flowered rhododendron, black huckleberry and, frequently, false azalea. The rich and diverse herb layer consists of oak fern, Sitka valerian, five-leaved bramble, rosy twistedstalk and one-leaved foamflower. The patchy moss layer is dominated by red-stemmed feathermoss. Soils are dominantly Humo-Ferric Podzols.

Dry Sites: Bl and Se form open climax stands. Black huckleberry dominates an understory containing a moderate cover of red-stemmed feathermoss and curly heron's-bill moss. Mountain arnica and one-leaved foamflower are common, but low in cover.

Wet Sites: These sites are characterized by open stands of Bl and Se. Devil's club dominates seepage sites. Herbs are numerous, with lady fern, Sitka valerian, oak fern and one-leaved foamflower the most prevalent. A patchy moss layer of *Brachythecium* spp. is present. Arrow-leaved groundsel and horsetails prevail on hygric sites, while sedges and sphagnums dominate the wettest sites.

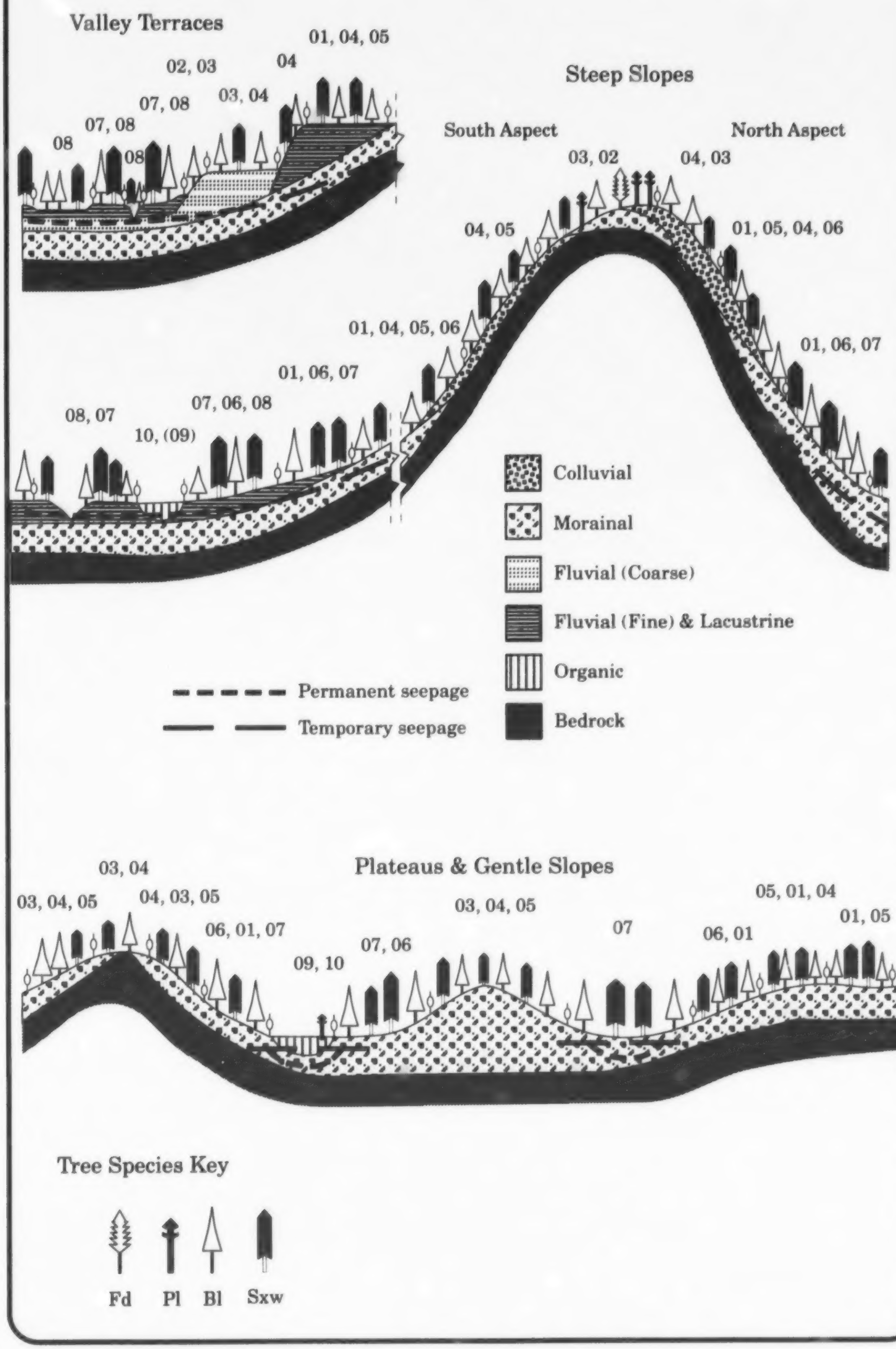
BGC Features: The presence of white-flowered rhododendron and Sitka valerian distinguishes the ESSF from other zones. The presence of false azalea, oak fern and rosy twistedstalk, and the absence of Hm, distinguishes the ESSFwc2 from all other ESSF units in the KFR.

Comments: The area mapped as ESSFwc2 includes a narrow band of the ESSFvv, above 1650 m, which has not been delineated because of mapping limitations.



02	Pl — Huckleberry — Cladonia
03	Bl — Huckleberry — Arnica
04	Bl — Rhododendron — Heron's-bill
05	Bl — Azalea — Feathermoss
Zonal 01	Bl — Azalea — Oak fern
06	Bl — Valerian — Oak fern
07	Bl — Devil's club — Lady fern
08	Bl — Horsetail — Sphagnum
09	Pl — Dwarf blueberry — Sphagnum
10	Sedge — Sphagnum

ESSF wc2


Valley Terraces
01, 04, 05
02, 03
04
07, 08
03, 04
08
07, 08
08
Steep Slopes
South Aspect
North Aspect
03, 02
04, 03
04, 05
01, 05, 04, 06
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01, 06, 07
01, 06, 07
08, 07
07, 06, 08
10, (09)
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
03, 04
03, 04, 05
04, 03, 05
06, 01, 07
09, 10
07, 06
03, 04, 05
07
06, 01
05, 01, 04
01, 05
Tree Species Key
Fd
Pl
Bl
Sxw

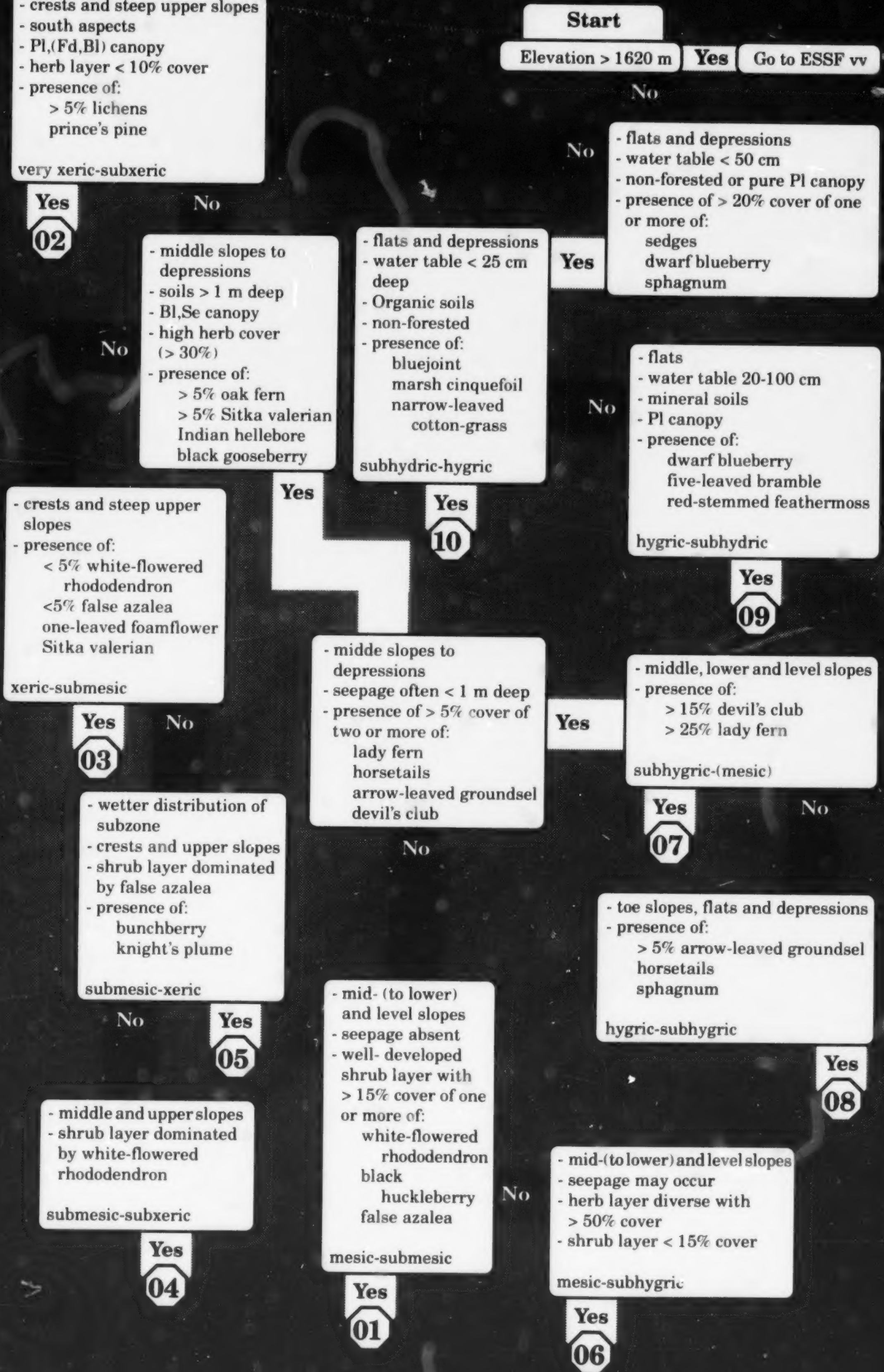
ESSF wc2 Vegetation Table

	Site Units	02	03	04	05	01	06	07	08	09	10	
Trees	*Pseudotsuga menziesii* var.*glauca*	▪										interior Douglas-fir
	Pinus contorta	▬		▪						▬		lodgepole pine
	Abies lasiocarpa	■	■	■	▬	▬	■	■	■	■		subalpine fir
	Picea engelmannii	■	■	■	■	■	■	■	■	▪		Engelmann spruce
Shrubs	*Vaccinium membranaceum*	▬	▬	■	■	■	▪	■	■			black huckleberry
	Rhododendron albiflorum		▪	▬	■	▬		▪	■			white-flowered rhododendron
	Menziesia ferruginea			▪	▬	■		■	■			false azalea
	Vaccinium ovalifolium				▪	▪	▪	▪	■			oval-leaved blueberry
	Ribes lacustre						▪	▪	■			black gooseberry
	Oplopanax horridus							■				devil's club
Herbs	*Chimaphila umbellata*	▪										prince's pine
	Cornus canadensis				■							bunchberry
	Clintonia uniflora				▪	▪						queen's cup
	Thalictrum occidentale						▪					western meadowrue
	Arnica latifolia		■	▪		▪	■		▪			mountain arnica
	Tiarella unifoliata		■			■	■	■	▪			one-leaved foamflower
	Streptopus roseus		▪		▪	■	■	▪	■			rosy twistedstalk
	Valeriana sitchensis		▪			■	▬	■	■	▪		Sitka valerian
	Rubus pedatus			■	■	■	▪	■	▪	■		five-leaved bramble
	Gymnocarpium dryopteris					■	■	■	■			oak fern
	Veratrum viride					▪	▪	▪	▪			Indian hellebore
	Mitella breweri						▪	▪	▪			Brewer's mitrewort
	Athyrium filix-femina							▬	▪			lady fern
	Parnassia fimbriata								▪			fringed grass-of-Parnassus
	Senecio triangularis								■			arrow-leaved groundsel
	Equisetum arvense								■	▪		common horsetail
	Carex spp.								▪	■	■	sedges
	Eriophorum angustifolium										■	narrow-leaved cotton-grass
	Potentilla palustris										▪	marsh cinquefoil
	Calamagrostis canadensis										▪	bluejoint
	Vahlodea atropurpurea									■		mountain hairgrass
	Vaccinium caespitosum									▬		dwarf blueberry
Mosses, Lichens & Liverworts	*Dicranum howellii*	■										moss
	Cladonia spp.	■			▪					▪		lichens
	Dicranum fuscescens	■	■	■	▪		▪					curly heron's-bill moss
	Pleurozium schreberi	■	■	■	▬	■	▪	▪	▪	■		red-stemmed feathermoss
	Barbilophozia lycopodioides			▪	▪	▪	▪					common leafy liverwort
	Brachythecium spp.				▪	▪	■	■	▪			mosses
	Sphagnum spp.								■	▬	▬	sphagnums
	Timmia austriaca									■		moss

ESSF wc2 Environment Table

Site Units	02	03	04	05	01	06	07	08	09	10
					Zonal					
Soil Moisture Regime	VX-SX	X-SM	SM-SX	SM-X	M-SM	M-SHG	SHG-(M)	HG-SHG	SHD-HG	SHD-HG
Prevailing Successional Stage Sampled	Maturing Seral	Maturing Climax							Young Climax	Maturing Climax
Aspect	South	All						N/A		
Slope Gradient & Mesoslope Position	Steep Upper & crest		Gentle - steep Middle - upper	Gentle Upper & crest	Gentle Middle & level		Gentle - steep Middle & level	Gentle Toe, level & depress.	Flat Level	Flat Level & depression
Soil Texture Class	Variable						Medium	Variable	Medium	Organic
Parent Materials	Mv,Cv	Mv,Mb	Mb,(Cb)	Mv,Mb	Mb,Cv/Mb	Mb	Mb,(Fb)	Fv/Mb,Fb	Fv/Mb	Ob
Important Soil Features	L 10-100	L > 50	Some L	L > 50	—	Minor W		W 20-70	W 20-100	W 2-25

ESSF wc2



Start

Elevation > 1620 m | **Yes** | Go to ESSF vv

- flats and depressions
- water table < 50 cm
- non-forested or pure Pl canopy
- presence of > 20% cover of one or more of:
  - sedges
  - dwarf blueberry
  - sphagnum

- flats and depressions
- water table < 25 cm deep
- Organic soils
- non-forested
- presence of:
  - bluejoint
  - marsh cinquefoil
  - narrow-leaved cotton-grass

subhydric-hygric

- flats
- water table 20-100 cm
- mineral soils
- Pl canopy
- presence of:
  - dwarf blueberry
  - five-leaved bramble
  - red-stemmed feathermoss

hygric-subhydric

- crests and steep upper slopes
- south aspects
- Pl,(Fd,Bl) canopy
- herb layer < 10% cover
- presence of:
  - > 5% lichens
  - prince's pine

very xeric-subxeric

- middle slopes to depressions
- soils > 1 m deep
- Bl,Se canopy
- high herb cover (> 30%)
- presence of:
  - > 5% oak fern
  - > 5% Sitka valerian
  - Indian hellebore
  - black gooseberry

- crests and steep upper slopes
- presence of:
  - < 5% white-flowered rhododendron
  - <5% false azalea
  - one-leaved foamflower
  - Sitka valerian

xeric-submesic

- midde slopes to depressions
- seepage often < 1 m deep
- presence of > 5% cover of two or more of:
  - lady fern
  - horsetails
  - arrow-leaved groundsel
  - devil's club

- middle, lower and level slopes
- presence of:
  - > 15% devil's club
  - > 25% lady fern

subhygric-(mesic)

- wetter distribution of subzone
- crests and upper slopes
- shrub layer dominated by false azalea
- presence of:
  - bunchberry
  - knight's plume

submesic-xeric

- toe slopes, flats and depressions
- presence of:
  - > 5% arrow-leaved groundsel
  - horsetails
  - sphagnum

hygric-subhygric

- middle and upper slopes
- shrub layer dominated by white-flowered rhododendron

submesic-subxeric

- mid- (to lower) and level slopes
- seepage absent
- well- developed shrub layer with > 15% cover of one or more of:
  - white-flowered rhododendron
  - black huckleberry
  - false azalea

mesic-submesic

- mid-(to lower) and level slopes
- seepage may occur
- herb layer diverse with > 50% cover
- shrub layer < 15% cover

mesic-subhygric

VERY DRY COLD
ENGELMANN SPRUCE – SUBALPINE FIR SUBZONE

Distribution: The ESSFxc is located on the west side of the Fraser River in the Chilcotin, Camelsfoot and Lillooet ranges. It occupies isolated mountain tops across the Thompson Plateau, including Blustry, Cornwall, Gnawed, Chuwhels, Pennask and Apex. It is most extensive on the Graystokes Plateau east of Kelowna, the Okanagan Range south of Keremeos, and the upper drainage basins of Criss Creek and the Deadman River northwest of Kamloops. It occurs above the MSxk.

Elevational Range (Mean): 1650-2060 m

Climate: The ESSF zone is characterized by long, cold winters with a high snow cover and short, cool summers. The ESSFxc represents the driest, highest-elevation forested ESSF subzone in the KFR. Snow packs rarely exceed 80-100 cm and frost can occur throughout the summer.

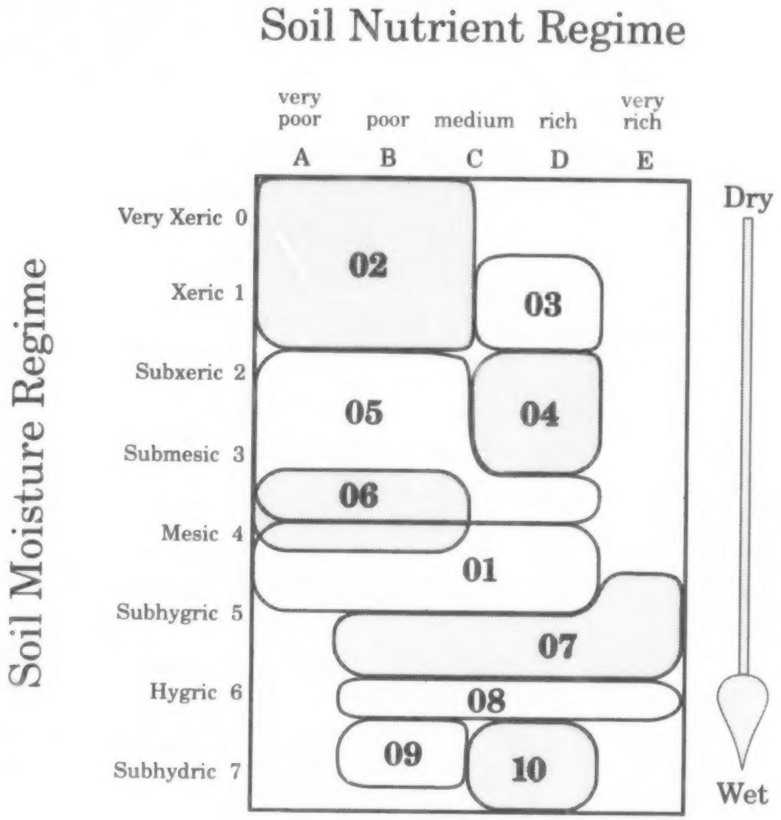
Vegetation and Soils

Zonal Sites: Open climax stands are composed of Bl and Se. As a result of fire history, there is a Pl component in most stands. The shrub layer is poorly developed; only black huckleberry is common. Grouseberry, five-leaved bramble, Sitka valerian and mountain arnica dominate the understory. The prevalent moss is red-stemmed feathermoss. Soils are Humo-Ferric Podzols and Dystric Brunisols.

Dry Sites: Open, mature seral stands are dominated by Pl. The sparse understory contains common juniper, grouseberry and pinegrass. On exposed southern ridges, a low cover of bluebunch wheatgrass, western pasqueflower and lichens may occur.

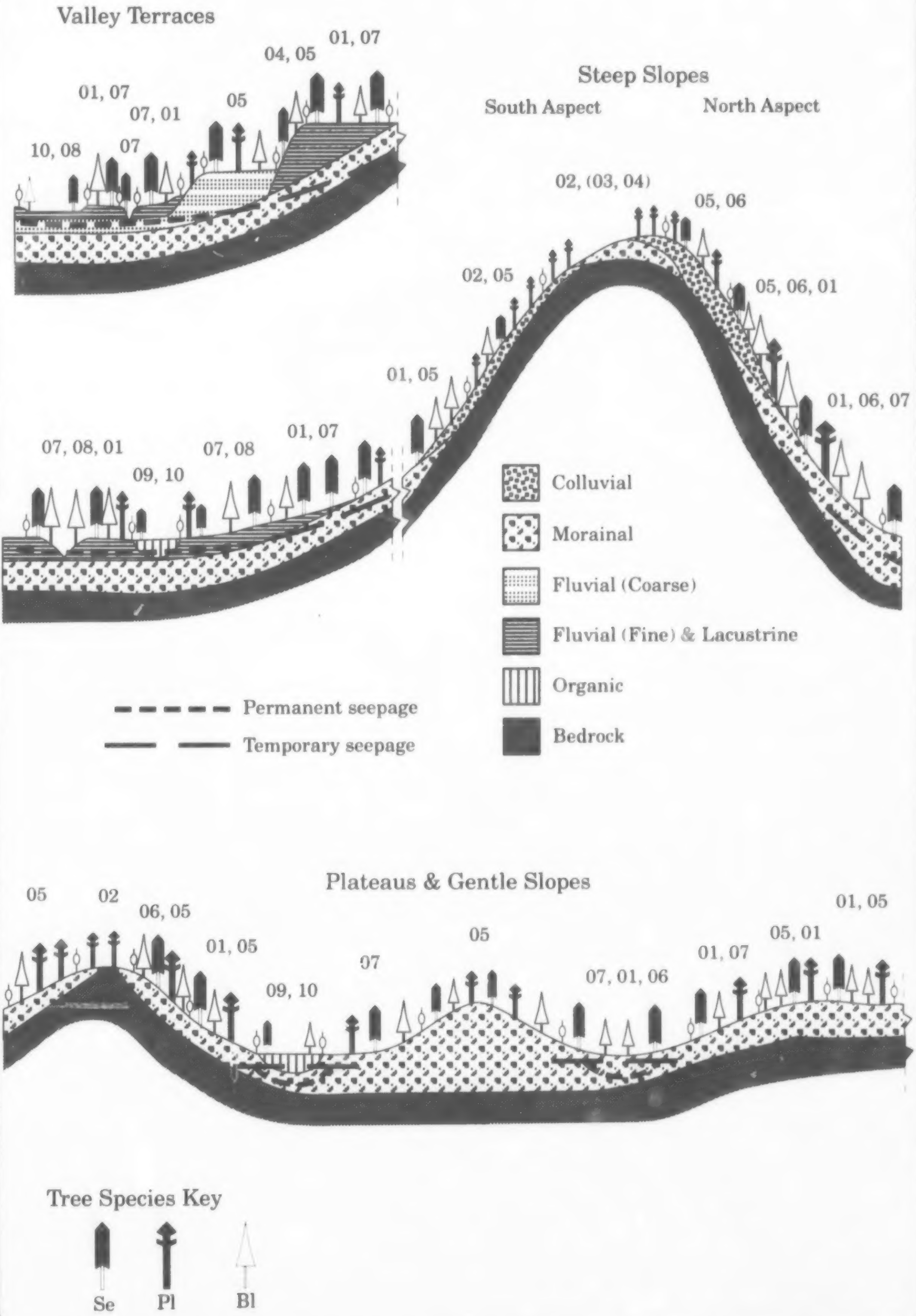
Wet Sites: Se and Bl form open climax forests. The diverse, herb-dominated understory contains Sitka valerian, globeflower and black gooseberry. Common horsetail, glow moss and *Mnium nudum* occur on wetter sites.

BGC Features: The ESSF is distinguished from other zones by the presence of white-flowered rhododendron and Sitka valerian. The absence of white-flowered rhododendron from all landscape positions except steep, north slopes and depressions distinguishes the ESSFxc from other ESSF subzones in the KFR.



02	Pl — Juniper — Lupine
03	Bluebunch wheatgrass — Pasqueflower
04	Pinegrass — Meadowrue
05	Bl — Grouseberry — Cladonia
06	Bl — Rhododendron — Grouseberry
Zonal 01	Bl — Grouseberry — Valerian
07	Bl — Gooseberry — Foamflower
08	Bl — Horsetail — Glow moss
09	Bluejoint — Sedge
10	Willow — Sedge

ESSF xc


Valley Terraces
10, 08
01, 07
07, 01
07
05
04, 05
01, 07
Steep Slopes
South Aspect
North Aspect
02, (03, 04)
05, 06
02, 05
05, 06, 01
01, 05
01, 06, 07
07, 08, 01
09, 10
07, 08
01, 07
Colluvial
Morainal
Fluvial (Coarse)
Fluvial (Fine) & Lacustrine
Organic
Bedrock
Permanent seepage
Temporary seepage
Plateaus & Gentle Slopes
05
02
06, 05
01, 05
09, 10
07
05
07, 01, 06
01, 07
05, 01
01, 05
Tree Species Key
Se
Pl
Bl

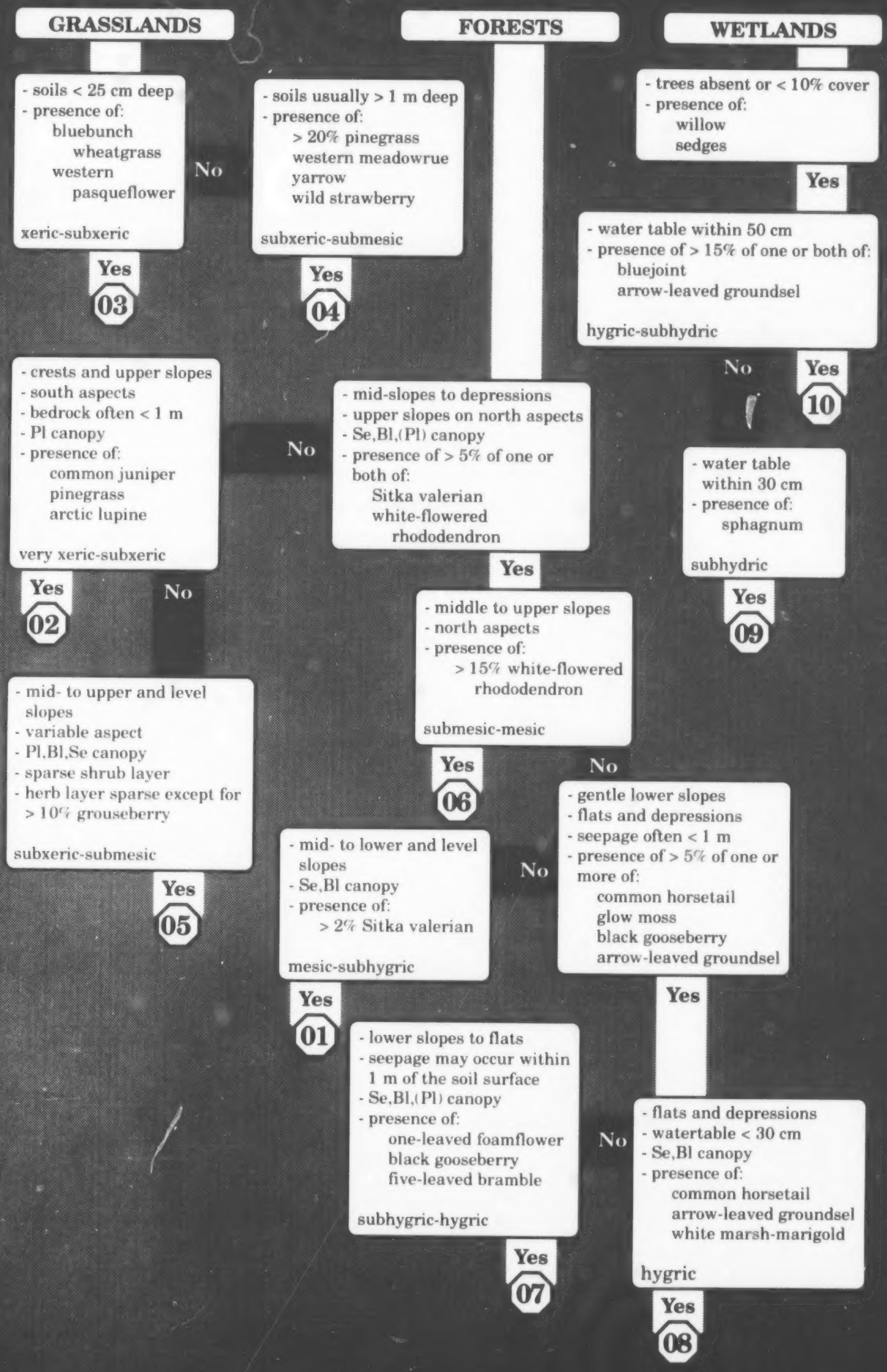
ESSF xc Vegetation Table

	Site Units	02	03	04	05	06	01	07	08	09	10	
Trees	*Pinus contorta*	▬▬			▬	■	▏	▬				lodgepole pine
	Abies lasiocarpa	▏			▬	▬▬	▬▬	▬	▬		▏	subalpine fir
	Picea engelmannii				■	▬	▬	▬	▬		▏	Engelmann spruce
Shrubs	*Juniperus communis*	▬										common juniper
	Rhododendron albiflorum					▬▬						white-flowered rhododendron
	Vaccinium membranaceum				▏	■	▏					black huckleberry
	Ribes lacustre							■				black gooseberry
	Salix spp.									▬	▬	willows
Herbs	*Agropyron spicatum*		■									bluebunch wheatgrass
	Pulsatilla occidentalis		■									western pasqueflower
	Allium cernuum		▏									nodding onion
	Heuchera cylindrica		▏									round-leaved alumroot
	Koeleria macrantha		▏	▏								junegrass
	Thalictrum occidentale			▬								western meadowrue
	Achillea millefolium			■								yarrow
	Calamagrostis rubescens	▬		▬▬								pinegrass
	Lupinus arcticus	■		■								arctic lupine
	Fragaria virginiana	▏		▬								wild strawberry
	Arnica cordifolia	▏				▏						heart-leaved arnica
	Vaccinium scoparium	■			▬▬	▬	▬▬	▏				grouseberry
	Arnica latifolia				▏	▏	■	■				mountain arnica
	Rubus pedatus				▏	▏	▬	■	▏			five-leaved bramble
	Tiarella unifoliata							■				one-leaved foamflower
	Valeriana sitchensis						▬	▬	▬			Sitka valerian
	Trollius laxus							▏	■		▏	globeflower
	Equisetum arvense								▬▬			common horsetail
	Caltha leptosepala								▏			white marsh-marigold
	Senecio triangularis								■		▬	arrow-leaved groundsel
	Calamagrostis canadensis										▬▬	bluejoint
	Carex spp.									▬▬	▬	sedges
	Potentilla palustris									▏		marsh cinquefoil
Mosses & Lichens	*Pleurozium schreberi*				■	▬	▏					red-stemmed feathermoss
	Cladonia spp.				■							lichens
	Brachythecium spp.				▏	▏	■	■	▏			mosses
	Mnium spp.								▬			leafy mosses
	Aulacomnium palustre							■	■	▏		glow moss
	Calliergon spp.								▏		▬	mosses
	Sphagnum spp.									▬		sphagnums
	Drepanocladus spp.									■		mosses

ESSF xc Environment Table

Site Units	02	03	04	05	06	01 Zonal	07	08	09	10
Soil Moisture Regime	VX-SX	X-SX	SX-SM	SM-SX	SM-M	M-SHG	SHG-HG	HG	SHD-HG	HG-SHD
Prevailing Successional Stage Sampled	Maturing Seral					Maturing Climax				
Aspect	Primarily South			All	North	All		N/A		
Slope Gradient & Mesoslope Position	Steep - gentle Upper & crest			Gentle - steep Middle - upper & level	Middle - upper	Gentle Middle - lower & level	Gentle Lower & level	Flat Depression & level		
Soil Texture Class	All	Fine		All			Fine		Organic	Org.-fine
Parent Materials	Mv,Cv	Mv,Cv	Mb,Cb	Mb	Mb,(Cb)	Mb	Mb,Fv/Mb	Ov/Mb-Fb	Ob	Ob,Fv/Mb
Important Soil Features	L 20-100	L 10-35	Some L	--------			W 25-100	W 10-30	W 5-30	W 5-50

ESSF xc



GRASSLANDS

- soils < 25 cm deep
- presence of:
  - bluebunch wheatgrass
  - western pasqueflower

xeric-subxeric

Yes 03 · No →

- soils usually > 1 m deep
- presence of:
  - > 20% pinegrass
  - western meadowrue
  - yarrow
  - wild strawberry

subxeric-submesic

Yes 04

FORESTS

- crests and upper slopes
- south aspects
- bedrock often < 1 m
- Pl canopy
- presence of:
  - common juniper
  - pinegrass
  - arctic lupine

very xeric-subxeric

Yes 02 · No

- mid- to upper and level slopes
- variable aspect
- Pl,Bl,Se canopy
- sparse shrub layer
- herb layer sparse except for > 10% grouseberry

subxeric-submesic

Yes 05

No

- mid-slopes to depressions
- upper slopes on north aspects
- Se,Bl,(Pl) canopy
- presence of > 5% of one or both of:
  - Sitka valerian
  - white-flowered rhododendron

Yes

- middle to upper slopes
- north aspects
- presence of:
  - > 15% white-flowered rhododendron

submesic-mesic

Yes 06 · No

- gentle lower slopes
- flats and depressions
- seepage often < 1 m
- presence of > 5% of one or more of:
  - common horsetail
  - glow moss
  - black gooseberry
  - arrow-leaved groundsel

No

- mid- to lower and level slopes
- Se,Bl canopy
- presence of:
  - > 2% Sitka valerian

mesic-subhygric

Yes 01

Yes

- flats and depressions
- watertable < 30 cm
- Se,Bl canopy
- presence of:
  - common horsetail
  - arrow-leaved groundsel
  - white marsh-marigold

hygric

Yes 08 · No

- lower slopes to flats
- seepage may occur within 1 m of the soil surface
- Se,Bl,(Pl) canopy
- presence of:
  - one-leaved foamflower
  - black gooseberry
  - five-leaved bramble

subhygric-hygric

Yes 07

WETLANDS

- trees absent or < 10% cover
- presence of:
  - willow
  - sedges

Yes

- water table within 50 cm
- presence of > 15% of one or both of:
  - bluejoint
  - arrow-leaved groundsel

hygric-subhydric

Yes 10 · No

- water table within 30 cm
- presence of:
  - sphagnum

subhydric

Yes 09

6 MANAGEMENT INTERPRETATIONS

The biogeoclimatic ecosystem classification provides a framework for organizing our knowledge about ecosystems. The properties, capabilities and operating constraints of classified units can be used to predict the response to forest management practices.

Interpretations may be as informal as applying a successful operational practice to an ecologically-equivalent site, or they may be formalized guidelines for a specific activity such as slashburning. Interpretations may be developed for silviculture, timber harvesting, wildlife, range and pest management. Biogeoclimatic units are well suited to broad provincial and regional interpretations; site units are better suited for more site-specific interpretations.

Biogeoclimatic zones, subzones and variants provide a suitable framework for delineating seed zones, developing local yield tables, identifying operating windows for harvesting and silviculture activities, stratifying inventory zones, and predicting forest pest problems. Climatic information for each biogeoclimatic unit can be used to guide additional interpretations.

Site units, by definition, have more specific environmental limits than biogeoclimatic units. Site series attributes such as soil moisture and nutrient regime, water table depth, soil texture, aspect, and slope gradient are important factors for developing many interpretations. A high water table will influence harvesting and site preparation strategies. Steep slopes are more susceptible to surface erosion than gentle slopes. These are relatively straight forward interpretations. The physical characteristics of site units may also be used to develop many other interpretations including erosion hazard, soil compaction hazard, brush hazard, tree species suitability, productivity estimates, and stocking standards.

Management prescriptions, such as site preparation and timber harvesting guidelines, incorporate interpretations, but also require consideration of management objectives and economic feasibility; factors that are not inherent properties of site units or biogeoclimatic units.

Interpretations in this section include forage seed mix, conifer pests, stocking standards, preferred and acceptable tree species, and prescribed fire sensitivity. Additional interpretations will be developed in the future, starting with estimates of site productivity and brush hazard. All interpretations are meant to be management **guidelines**. They should not be used in a “codebook” manner. For areas that are transitional between classification units, interpretations for both units should be considered when developing a prescription.

Site Sensitivity to Prescribed Fire for the Southern Interior of British Columbia

This key qualitatively evaluates site sensitivity to both nutrient loss from prescribed fire and reduction in growing season moisture. It assumes that LFH depth, humus form, moisture availability, soil texture and soil depth determine site nutrient capital and growing season moisture availability. Because other factors may also affect site sensitivity to prescribed fire, personal experience should be followed when this key is applied. **It should be used primarily as a checklist of the factors relevant to the formulation of prescribed fire objectives and prescriptions**.

The key is a trial model for use in the southern interior of British Columbia.[1] It has had limited field testing and calibration. Future research and operational burning results will be used to refine the key.

Definitions of Terms Used in the Slashburning Sensitivity Key

1. **LFH depth**: the depth of the surface organic layers, **not including moss layers, or slash**. To determine LFH depth, average 20 independent LFH depth measurements, distributed widely over the treatment unit. Ideally, LFH sample points should be located at regular intervals along one or more transects through the site unit.

2. **Moisture availability**: this refers to the actual growing season moisture available for plant growth, also called the absolute moisture regime. It reflects a combination of climatic moisture inputs, subsurface moisture inputs and soil moisture holding capacity. Eight classes of absolute moisture regime are grouped into three moisture classes for the Slashburning Sensitivity Key:

    - **Dry** – water deficit occurs for a significant part of the growing season (> 30 days/year); no water table or seepage in the rooting zone.
    - **Moist** – no significant water deficit occurs during the growing season; **temporary** water table or seepage may occur in the rooting zone.
    - **Wet** – no water deficit occurs during the growing season; water table or seepage present continuously in the rooting zone; water supply exceeds demand.

Soil moisture availability classes are shown on the following table:

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[1] This key is based on draft reports produced by Gerry Still, B.C. Ministry of Forests, Victoria, B.C. and Scott Lindeburgh, Clearwater, B.C.

The Relationship Between Potential and Absolute Soil

Potential or Relative Soil Moisture Regime for BGC Units	BG			PP		IDF							MS				SBS
	xh 1	xh 2	xw 1	xh 1	xh 2	xh 1	xh 2	dk 1	dk 2	dm 1	mw 1	mw 2	xk	dm 1	dm 2	dc	mm
Very Xeric 0	02		02														
		02		02	02		02		02		02		02	02		02	
Xeric 1						02		02		02		02	03		02		02
	03	03	03				03				03		04	03			03
Subxeric 2					03	03		03	03	03					03		
		04				04	04					03				03	04
	04		04	03				04			04		05	04			05
Submesic 3				04	04	05				04					04		
		05			05	06	05										06
			01	01				01	01	01			01				
Mesic 4	01	01			01	01	01				01	01	06	01	01	01	01
	05	06	05	05		07	06		04	05							
	06	07	06	06	06	08	07	05	05		05	04	07	05	05	04	07
Subhygric 5			07	07						06			08	06	06		
			08				08	06	06		06		09		07		08
Hygric 6	07	08	09	08	07	09		07	07	07				07			
Subhydric 7																	

* Absolute Moisture Regime Classes (after Klinka *et al.* 1984).

Moisture Regime for Site Units in the Kamloops Forest Region

ESSF								ICH						Estimated Absolute Soil Moisture Regime*	Moisture Classes for Slashburning Sensitivity Key
xc	dc 1	dc 2	dv	mw	wc 2	vc	vv	mk 1	mk 2	mw 2	mw 3	wk 1	vk 1		
								02	02		02				
03		02	02	02	02		02							**Very Dry** Deficit 60-120 days/yr.	
	02					02		03	03	02	03	02			**Dry**
04			03										02	Moderately Dry	
02		03		03	03	03	03					03			
	03	04	04											Deficit 30-60 days/yr.	
				04	04			04		03	04		03	**Slightly Dry**	
05		05			05				04			04		Deficit 0-30 days/yr.	
											05				
	01		01	01				01	01	01	01				
06		01													**Moist**
01	04												01		
07	05	06	05	06	07	04	04	06	05	05	07	05		Moist to Very Moist	
		07		07						06		06	05	Slight Surplus	
08	06	08		08	08	05		07	06					**Wet**	
			06				(05)			07	08	07	08	**Excessive Water**	**Wet**

3. **Soil textural class**: use the following table.

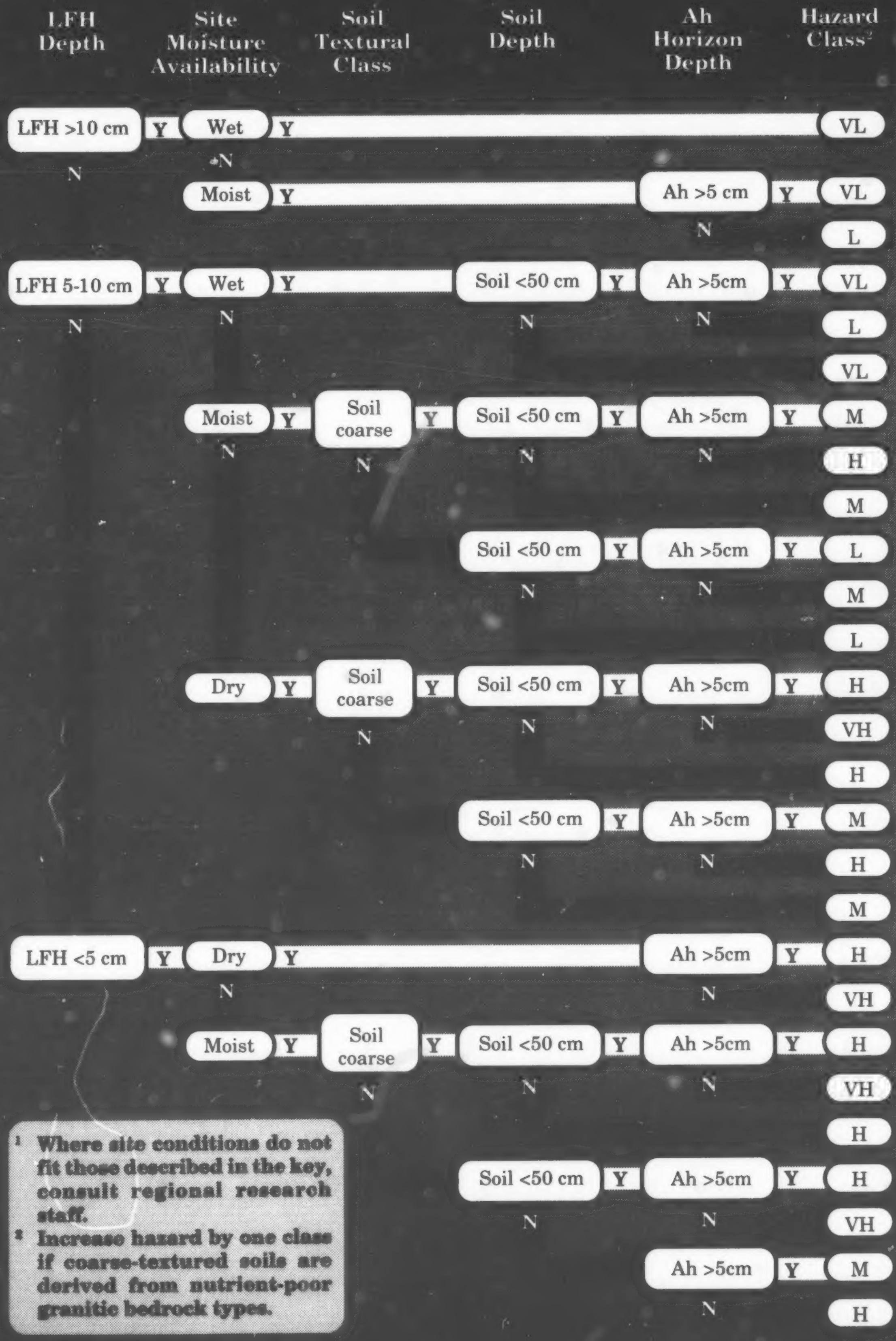
Soil texture	Textural class 0-35	 35-70	 70+
S	C	C	C
LS	C	C	C
SL	M	C	C
Si	M	M	C
SiL	M	M	C
L	M	M	C
SCL	M	M	C
SiCL	F	M	M
CL	F	M	M
SC	F	F	M
SiC	F	F	M
C	F	F	M

C = Coarse; M = Medium; F = Fine

4. **Soil depth**: the depth to an impermeable, root-restricting layer, such as bedrock, or a compacted or cemented soil layer. Two classes are recognized: deep (>50 cm) and shallow (<50 cm). A soil should be considered shallow if an impermeable soil layer occurs within 50 cm of the soil surface, and/or exposed bedrock occupies more than 25% of the site.

5. **Ah Horizon**: an organically enriched, upper mineral horizon. The deeper the Ah horizon, the more resilient a site is to nutrient depletion. However, where a deep Ah horizon occurs on dry site units, the loss of litter from prescribed fire may aggravate growing season soil water deficits.

Key for Assessing Site Sensitivity to Prescribed Fire for the Southern Interior of B.C.[1]



LFH Depth | Site Moisture Availability | Soil Textural Class | Soil Depth | Ah Horizon Depth | Hazard Class[2]

LFH >10 cm Y Wet Y VL
N N
Moist Y Ah >5 cm Y VL
N L
LFH 5-10 cm Y Wet Y Soil <50 cm Y Ah >5cm Y VL
N N N N L
VL
Moist Y Soil coarse Y Soil <50 cm Y Ah >5cm Y M
N N N N H
M
Soil <50 cm Y Ah >5cm Y L
N N M
L
Dry Y Soil coarse Y Soil <50 cm Y Ah >5cm Y H
N N N VH
H
Soil <50 cm Y Ah >5cm Y M
N N H
M
LFH <5 cm Y Dry Y Ah >5cm Y H
N N VH
Moist Y Soil coarse Y Soil <50 cm Y Ah >5cm Y H
N N N VH
H
Soil <50 cm Y Ah >5cm Y H
N N VH
Ah >5cm Y M
N H

[1] Where site conditions do not fit those described in the key, consult regional research staff.

[2] Increase hazard by one class if coarse-textured soils are derived from nutrient-poor granitic bedrock types.

Hazard Class Characteristics - Potential Impact of Fire

VL — **Very Low** hazard class

Prescribed fire is likely to have an insignificant impact on the soil. Soils tend to be wet or moist, and the LFH very thick. Burning may reduce the site's nutrient pool, but a large proportion of LFH will remain. Some of these sites may receive continuous or intermittent nutrient inputs through seepage. Soil moisture retention is not a consideration in making the prescription. Prescribed fire can be an effective tool for site preparation and short-term vegetation control on these sites. Burning may be difficult to initiate and maintain on wet sites.

L — **Low** hazard class

Fire, unless of a high intensity, is likely to have a low impact on the soil. Soils tend to be moist, and LFH depths may be thick. Burning may remove only a fraction of the surface organic layers. This loss, in relation to the total depth of surface organic materials and the quantity of organic matter in the mineral soil, is relatively insignificant. The remaining nutrient pool should be adequate for tree growth. Some of these sites may receive nutrient inputs from continuous or intermittent seepage. Soil moisture retention is not a consideration in making the prescription. Prescribed fire can be an effective tool for site preparation and short-term vegetation control on these sites. Burning may be difficult to initiate and maintain on wet sites.

M — **Medium** hazard class

Fire has a potentially moderate impact on the soil. Preservation of surface organic layers will help maintain long-term site productivity. Soils tend to be moist, although growing season moisture deficits may occur, and LFH depths may be moderately thick. Prescribed fire should be managed to minimize LFH losses. Reducing LFH of more than 50% should be avoided. Careful planning and pre-burn monitoring of duff moisture conditions are required to minimize the impact from burning.

H — High hazard class

Removal of protective vegetative cover and forest floor by prescribed fire may have a high impact on the soil. Preservation of surface organic layers is required to maintain long-term site productivity. Growing season moisture deficits are pronounced, and many sites are nutrient-poor. The LFH depths are usually thin. Soils are very susceptible to nutrient depletion where an Ah horizon does not exist. Soil moisture deficits may also increase due to prescribed fire. Prescribed fire for site preparation purposes is generally **not** advisable. Careful pre-burn monitoring of duff moisture conditions and an excellent prescribed fire plan is required if the burn's impact is to be minimized.

VH —Very High hazard class

Prescribed fire will likely cause severe nutrient losses or aggravate soil water deficits, resulting in poor regeneration performance. Preservation of surface organic layers will help maintain long-term site productivity. Soil moisture availability tends to be the major factor in site productivity. Growing season moisture deficits are extreme, and site nutrient status is low. The surface organic layer may account for a significant part of the soil water-holding capacity. It may also account for a significant part of the nutrient pool on sites lacking an Ah horizon. Prescribed fire for site preparation is **not** advisable. Careful pre-burn monitoring of duff moisture conditions and excellent prescribed fire planning are required to prevent detrimental impacts.

Conifer Pests in the Kamloops Forest Region[1]

The ability to recognize edaphic and floristic components of an ecosystem improves the forest managers' effectiveness. The ability to forecast potential damaging agents occurring in the managed ecosystem could prevent significant losses and enhance site productivity. The objective of this pest-subzone/variant matrix is to indicate the distribution of major forest pests in the KFR.

The matrix is a first approximation. It considers only the general distribution of the host and pests within the subzone/variant and does not consider extremely wet or dry site conditions.

Contributions to the matrix were made by pest management staff of the Clearwater, Kamloops, Salmon Arm and Vernon Forest Districts, the Kamloops Region, and Forestry Canada, Forest Insect and Disease Survey Rangers.

Components of the matrix either identify direct pest observation, expected pest incidence, or no pest occurrence. Observed and anticipated occurrence are further rated by intensity of pest occurrence on a low, medium and high scale.

The information is presented with two levels of confidence. The matrix co-ordinates portrayed by tones of shading represent actual observations; those with tones of shading and a question mark represent speculated incidence.

Legend for Pest Intensity

Observed	Speculated	
☐		Empty cells indicate that there is no evidence of the pest occurring in that subzone/ variant, or that the host is generally absent
☐	☐ ?	Low pest intensity
■	■	Moderate pest intensity
■	■ ?	High pest intensity

This matrix indicates which pests can be expected when management prescriptions are developed.

The matrix will be updated as additional information is made available. For further information, consult the Kamloops regional pest management guidelines.

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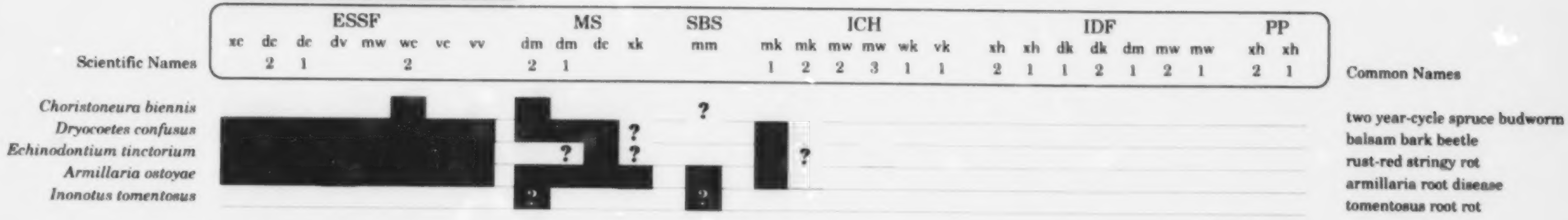
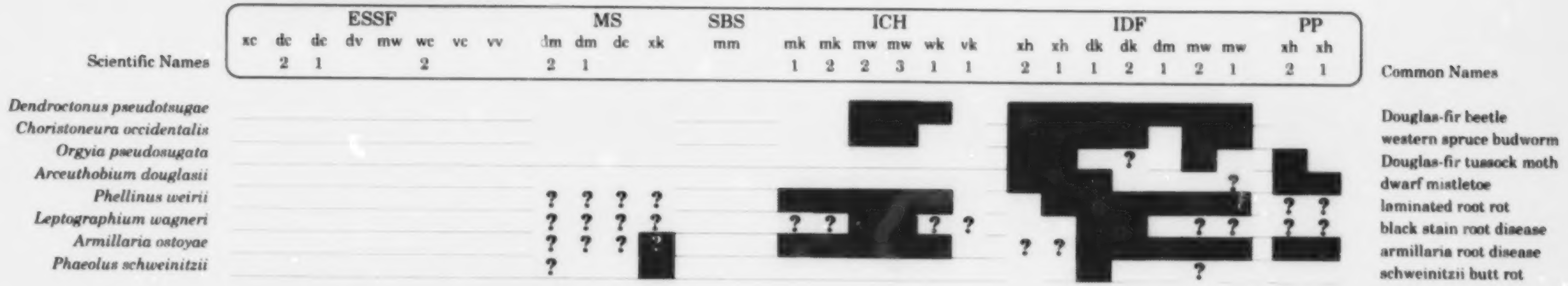
[1] These interpretations have been prepared with the assistance of Hadrian Merler, Forest Pathologist, and Lorraine MacLauchlin, Forest Entomologist, B.C. Ministry of Forests, Kamloops, B.C.

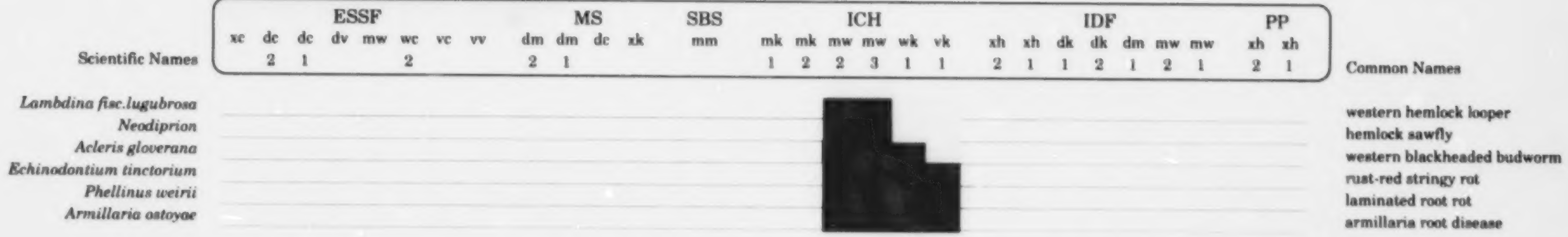
SUBALPINE FIR PESTS



DOUGLAS-FIR PESTS



WESTERN HEMLOCK PESTS



WESTERN LARCH PESTS

Scientific Names	ESSF								MS				SBS	ICH						IDF							PP		Common Names
	xc	dc 2	dc 1	dv	mw	wc 2	vc	vv	dm 2	dm 1	dc	xk	mm	mk 1	mk 2	mw 2	mw 3	wk 1	vk 1	xh 2	xh 1	dk 1	dk 2	dm 1	mw 2	mw 1	xh 2	xh 1	
Coleophora laricella										?				?															larch casebearer
Pristophora erichsonii										?				?															larch sawfly
Choristoneura occidentalis																■								■		■			western spruce budworm
Zeiraphera improbana																								■					budmoth
Actebia fennica										■				?		?								■		?			black army cutworm
Arceuthobium laricis										■				■		■								?		■			larch dwarf mistletoe
Hypodermella laricis														?		■								■		■			larch needle blight
Meria laricis										?						■								?		?			larch needlecast

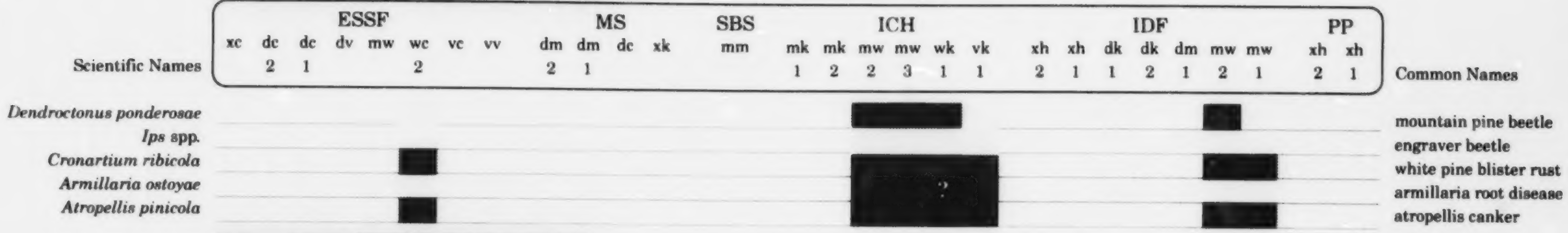
LODGEPOLE PINE PESTS

Scientific Names	ESSF								MS				SBS	ICH						IDF							PP		Common Names
	xc	dc 2	dc 1	dv	mw	wc 2	vc	vv	dm 2	dm 1	dc	xk	mm	mk 1	mk 2	mw 2	mw 3	wk 1	vk 1	xh 2	xh 1	dk 1	dk 2	dm 1	mw 2	mw 1	xh 2	xh 1	
Hylobius warreni		?		?	?	?			■	■	?			?	■		?					?	?	?	?	?			warren's root collar weevil
Dendroctonus ponderosae	■	■	■	■	■				■	■	■	■		■	■							■	■	■					mountain pine beetle
Ips pini	■	■	■	■	■	?			■	■	■	■		■	■	?	?					■	■	■	?	?			engraver beetle
Pissodes terminalis		?		?	?	?			■	■	?			?			?					■	■	■	?	?			lodgepole terminal weevil
Arceuthobium americanum	■	?	■						■	■	■	■		?			?					■	■	■		■			lodgepole pine dwarf mistletoe
Phellinus weirii										?		?			?	?								?					laminated root rot
Leptographium wagneri	?	■		?	?	?			■	■	■	■		■	?									■					black stain root disease
Cronartium spp.		■		?	?				■	■	?	■		■	?	?	?						?	?	?	?			comandra and stalactiform blister rust
Endocronartium harknessii	?	■	■	?	?	?			■	■	■	■		■		?	?					■	■	■					western gall rust
Rhizina undulata		?				?								■	?			?	?										rhizina root disease
Atropellis piniphila									■			■										■							atropellis canker
Armillaria ostoyae	■	?	■						■	■	■	■		?			?					■	■	■		■			armillaria root disease

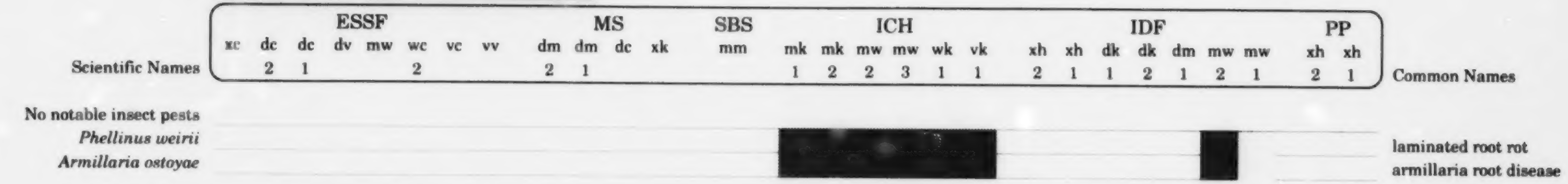
PONDEROSA PINE PESTS

Scientific Names	ESSF								MS				SBS	ICH						IDF							PP		Common Names
	xc	dc 2	dc 1	dv	mw	wc 2	vc	vv	dm 2	dm 1	dc	xk	mm	mk 1	mk 2	mw 2	mw 3	wk 1	vk 1	xh 2	xh 1	dk 1	dk 2	dm 1	mw 2	mw 1	xh 2	xh 1	
Dendroctonus ponderosae																					■					?			mountain pine beetle
Dendroctonus brevicomis																				?						?			western pine beetle
Dendroctonus valens																				■	■					?			turpentine beetle
Dioryctria albicapitana																										?			coneworm
Arceuthobium americanum																										?	?	?	dwarf mistletoe
Elytroderma deformans																				■	■					■	■	■	elytroderma disease
Armillaria ostoyae																					?					■	?	?	armillaria root disease

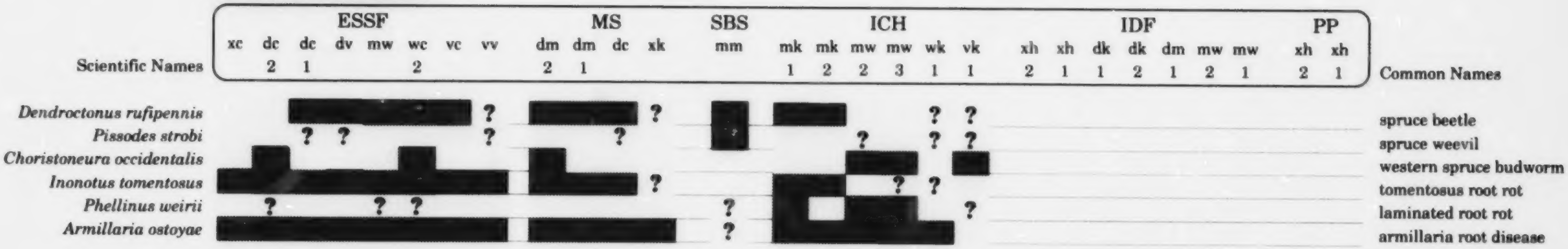
WESTERN WHITE PINE PESTS



WESTERN REDCEDAR PESTS



SPRUCE PESTS



Forage Seed Mix[1]

Seeding of skidtrails, landings, burns and cutovers with domestic grasses and legumes may provide a number of grazing benefits, including increased forage production, increased palatability, and extended grazing area. Seeding may also improve soil fertility, reduce soil erosion, enhance aesthetic appeal and prevent invasion of competitive non-crop vegetation. Indiscriminate seeding that leads to tall dense stands of grass that are not grazed may also have a negative impact on conifer establishment. Successful establishment of forage species is contingent upon species choice, rate of seeding, seedbed quality and the time of application. Lack of site specific information and the need for simplicity has prompted the Kamloops Regional range staff to adopt three forage seed mixes. Each is well suited to specific soil moisture conditions and has a proven track record. The species composition and prescribed aplication rates are summarized below:

Mix	Composition % by weight	Application Rate
Very Dry	55% crested wheat 45% alfalfa	10 kg/ha - cover seed by dragging after broadcast application or drill
Dry	10% orchard grass 25% crested wheat 20% annual ryegrass 35% perennial ryegrass 10% red clover	General use: broadcast 3 kg/ha
Moist	35% orchard grass 20% annual ryegrass 35% alsike clover 10% white clover	

The District or Regional Agrologist should be consulted to develop mixes suitable for areas that are extremely wet or ungrazed and when seeding is required for erosion or shrub control. For those sites with a choice of seed mix, the decision depends on the degree of disturbance, normal snow depth and management goals. A rehabilitation seed mix should be used on landings and skid trails.

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[1] Prepared with the assistance of Rick Tucker, B.C. Ministry of Forests, Kamloops Regional Range Planning Agrologist.

Forage Seed Mixes for Site Units

Potential or Relative Soil Moisture Regime for BGC Units	BG			PP		IDF							MS				SBS
	xh 1	xh 2	xw 1	xh 1	xh 2	xh 1	xh 2	dk 1	dk 2	dm 1	mw 1	mw 2	xk	dm 1	dm 2	dc	mm
Very Xeric	02		02														
		02		02	02		02		02		02		02	02		02	
Xeric						02		02		02		02	03		02		02
	03	03	03				03				[illegible]		04	03			[illegible]
Subxeric					04	03		[illegible]	[illegible]	[illegible]					[illegible]		
		04				[illegible]	[illegible]					[illegible]				[illegible]	[illegible]
	04		04	03				[illegible]			[illegible]		[illegible]	[illegible]			[illegible]
Submesic				04	05	[illegible]				[illegible]					[illegible]		
		05			03	[illegible]	[illegible]										[illegible]
			01	01				[illegible]	[illegible]	[illegible]			[illegible]				
Mesic	01	01			01	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	05	06	05	05		[illegible]	[illegible]		[illegible]	[illegible]							
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Subhygric			[illegible]	[illegible]						[illegible]			[illegible]	[illegible]	[illegible]		
			08				08	06	06		06		09		07		08
Hygric	07	08	09	08	07	09		07	07	07				07			
									08							05	09
Subhydric												05		08			

in the Kamloops Forest Region

ESSF								ICH					
xc	dc 1	dc 2	dv	mw	wc 2	vc	vv	mk 1	mk 2	mw 2	mw 3	wk 1	vk 1
								[illegible]	[illegible]		[illegible]		
03		02	02	[illegible]	[illegible]		[illegible]						
	02					[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
04			[illegible]										[illegible]
[illegible]		[illegible]		[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	
	[illegible]	[illegible]	[illegible]										
				[illegible]	[illegible]			[illegible]		[illegible]	[illegible]		[illegible]
[illegible]		[illegible]			[illegible]				[illegible]			[illegible]	
											[illegible]		[illegible]
	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]		[illegible]											
	[illegible]			[illegible]				[illegible]		[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
08	06	08		08	08	05		07	06				
			06				(05)			07	08	07	06
09	07	09			09	06		08			09		
10					10					08		08	

☐	Very dry seed mix
■	Very dry or dry seed mix
☐	Dry or moist seed mix
▨	Moist seed mix
■	Consult regional or district range specialist

Stocking Standards For the Kamloops Forest Region[1]

1. Introduction

Stocking standards for the Kamloops Forest Region have evolved over a period of 10-15 years. Those presented in this field guide represent the sixth draft. The fifth draft was amended to take advantage of the revised ecological classification system for the KFR and to present provincially correlated standards. Under the Forest Act (Bill 70, December 17, 1987) and Silviculture Regulations (April 1988), stocking standards must be developed for all forest land. Implementation of these standards is mandatory.

Stocking standards for each forest region were first developed independently by silviculture staff in each region. In the KFR, first approximations were generated from volume/age curves, yield tables, mean annual increment estimates, site index curves, tree mortality estimates, field observations, and growth and yield models. Consideration was also given to the trade-offs between the required stocking level and planting costs, stand tending requirements, and wood quality.

Comparison of stocking standards developed for each region revealed inconsistencies for equivalent ecosystems. Therefore, a committee was struck to correlate regional stocking standards. This committee included Forest Service staff and industrial representatives from COFI, NILS, ILMA and the CLMA. The group used its collective knowledge and experience to prepare mutually acceptable, provincially correlated and site-specific standards. Only those stocking standards for site units in the KFR are included in this guide.

A number of assumptions were made in developing these standards:

a) Only timber production objectives were considered. Therefore, adjustments may be required to accommodate integrated resource management issues on some sites.

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[1] Prepared with the assistance of Bernie Ivanco and Ron Newman, Kamloops Regional Silviculture staff.

b) Standards apply to only even-aged silvicultural systems and are aimed at producing sawlogs of a maximum piece size, for a pathologically safe rotation.
c) Consider the trade-off between planting costs, piece size, harvesting and milling costs and the need to minimize multiple stand entries.
d) The use of a single minimum stocking level for all tree species in a given site unit reflects operational constraints and the precision of silviculture surveys.
e) Target stands are expected to produce 400 or more well spaced crop trees with diameters of at least 25 centimetres during a rotation of about 100 years.
f) Extremely wet or dry sites have lower stocking requirements, due to the reduced carrying capacity.
g) All sites except extremely wet or dry ecosystems are capable of meeting similar product objectives over varying rotation periods.

2. Legal Authority and Requirements

The Forest Act requires that basic silviculture be carried out by the Forest Service on small business areas and by licensees on major tenures. A prescription to meet basic silviculture requirements must be detailed in an approved Pre Harvest Silviculture Prescription (PHSP) prior to harvest. As indicated by the Silviculture Regulations, stocking standards are a mandatory part of an approved PHSP.

Basic silviculture stocking standards and PHSPs must also be consistent with TSA Plans, TFL Management and Working Plans, and licensee development plans. These plans specify short- and long-term objectives for timber production and other forest resources. The timber production objectives stated in these plans are based on the assumption that certain levels of forest management **will** be carried out. If actual performance falls short of planned performance, Allowable Annual Cuts (AAC) will be reduced and the long-run sustainability of the timber resource will not be maintained.

The District Manager may allow (or require) deviations from these guidelines, both up and down, on a site specific basis with just cause. The reasons for any differences should be documented.

3. Purpose and Intent

The stocking standards are separated into targets and minimums. The targets aim to achieve management objectives for free-growing stands. The minimums are the minimum level of acceptable performance. These standards should be used as a guideline for restocking Crown lands and include:

a) targets and minimums to be used at the PHSP stage;
b) criteria to determine the free-growing status of young forests; and
c) criteria to identify satisfactory stocking of denuded lands.

4. Definitions

a) Silviculture system

Recommended silviculture systems are:

• CC	Clearcut system, unspecified size
• CC - small	Clearcut system, less than 2 ha in size
• CC - medium	Clearcut system, 2-15 ha in size
• SW	Shelterwood system
• SEL	Selection system
• ST	Seedtree
• AVOID	Harvesting is not recommended because of regeneration difficulties or site sensitivity to severe site degradation.

Silviculture systems are listed in order of preference.
Brackets ( ) are used to indicate which silviculture systems are conditionally or marginally acceptable. Specific site conditions should be closely evaluated before prescriptions for these sites are completed and approved.

b) **Acceptable regeneration height** is the minimum acceptable height (in centimetres) of a naturally regenerated tree at the regeneration stage. This number should be used as a **guideline** for determining whether or not a particular tree is considered to be acceptable. It is expected that once trees reach this size, most of them will develop into crop trees.

c) **Target stocking standard at free growing (TSS)** is the number of well-spaced, acceptable trees per hectare that will normally optimize timber production. The TSS is 50-70% higher than the Minimum Stocking Standard (MSS) and with normal mortality should achieve full stocking at rotation. Forest managers should strive to achieve the targets rather than the minimums.

Because of the growth characteristics of lodgepole pine, its TSS is generally slightly higher than that for other species.

Minimum and target stocking standards assume a normal or average random mortality level during the rotation. Where local experience or conditions indicate higher levels of mortality, stocking levels should be increased.

d) **Target stocking at the regeneration stage**, while not required by the Silviculture Regulations, is included as a guide to predicting whether target stocking standards will be met at the free-growing stage, and to developing site preparation prescriptions. The regeneration stage generally occurs in 4-7 years following initiation of the harvest. This is referred to as the regeneration delay.

e) **Target leader growth** is the length of either the most recent annual leader extension or the average leader growth for the last 3 years. The noted leader growth should exist when the free-growing assessment is made. If leader growth is less than the target for most of the stand's crop trees, the stand should be examined to determine why.

f) **Preferred and acceptable species** are those species which are ecologically suited to the site. Preferred species are those which best meet the management objectives for a site and will produce the greatest volume of high quality sawlogs over the rotation. Acceptable species may occur as a component of mixed stands but are not considered to be the target species for the site. The silviculture system, the intensity and method of site preparation, the rate and type of vegetation redevelopment, the impact of pests and diseases, and the product objectives must also be considered when species are being selected to regenerate a site.

Species shown in brackets ( ) are considered to be only marginally acceptable for regeneration and should account for a maximum of 30% of the trees used to assess stocking levels. Bracketed species should only be used after the site-specific conditions have been carefully assessed. They should not be considered for planting.

Footnotes are included for many species, to assist users in making the best species choice.

g) **Minimum stocking standard (MSS)** is the lowest number of acceptable, well-spaced stems per hectare required to consider an area satisfactorily stocked at the free-growing stage. Stands which have fewer stems than the TSS do not meet the management objectives and will result in yields which are below the site's capability. The MSS indicates the lowest acceptable stocking level.

Both target and minimum stocking standard guidelines consider well-spaced acceptable trees only. The total number of trees may be significantly higher.

h) **Minimum intertree spacing** is the minimum allowable horizontal distance between two well-spaced trees (in metres), and is used to determine the number of well-spaced trees at both the regeneration and free-growing stages.

The Silviculture Regulations state the minimum intertree spacing is 2 m, unless otherwise specified. Conditions will exist where it is desirable to lower this intertree spacing to allow for better use of micro-sites during planting, or for the anticipated clumpy stocking of naturally regenerated areas. In these guidelines, the lowest expected Minimum Intertree Spacing is provided and prescriptions should normally be above this limit.

i) **Regeneration delay** is the maximum period permitted to achieve the minimum stocking levels using the preferred and acceptable species of acceptable size, age and vigour. The regeneration delay period begins when harvesting begins.

The 4-year regeneration delay indicates that artificial regeneration is the preferred method of reforestation. The 7-year regeneration delay indicates that either planting or natural regeneration may be acceptable methods. Where both natural and artificial regeneration are acceptable options, the longer 7-year regeneration time frame should be used as the regeneration delay.

j) **Free-growing earliest and latest** describes the number of years after the start of harvesting that a free-growing assessment must be done to evaluate whether basic silviculture obligations have been met. For example, earliest free-growing date equals the actual regeneration delay achieved plus 5 years for all zones except the ESSF. A period of 8 years is used for the ESSF.

The earliest free-growing dates are based on a regeneration delay, as noted in the tables, plus a minimum of 5 years. If satisfactory regeneration occurs in less than the specified regeneration delay period, then the free-growing assessment period may be reduced to reflect the reduction in the regeneration delay period. The latest free-growing date indicates the maximum number of years following the start of logging that a free-growing stand must be in place.

A free-growing survey should not be completed until at least two growing seasons after a vegetation management treatment.

k) **Conifer/brush ratio** is the minimum height that a well- spaced crop tree must attain in relation to competing brush within a 1 m radius. A ratio of 150% means that the crop tree must be 50% taller than the competing brush.

l) **Maximum density** is the maximum total number of stems per hectare permitted for lodgepole pine and dry-belt Douglas-fir at the free-growing stage. Densities exceeding the maximum total stems per hectare must be reduced to the target stocking levels before an area meets the free-growing standard.

Maximum densities are being reviewed by the Chief Forester.

m) **A free-growing crop** is a crop of healthy trees, the growth of which is not impeded by competition from plants, shrubs or other trees.

Free-growing trees:

- are the preferred or acceptable species.
- grow at densities that meet the minimum stocking standards and do not exceed the maximum allowable densities.
- include natural regeneration that is at least 5 years old.
- include planted trees that have been in the ground for at least five years.
- have good form and are free of growth-impeding insects, disease and damage.
- are free of competing vegetation within a 1 m radius of the crop tree.

5. Quality of Individual Stems

Quality of individual trees is specified in regeneration and free-growing surveys. Quality standards have not been specified in the stocking standards.

Guidelines for determining acceptable site and stem quality for subalpine fir are presented in Herring 1977, Monchak 1982, and Ivanco 1987.

Provincial pest damage standards are listed in the Silviculture Manual (Sec. 4.3522). Regional guidelines for pest damage are also available.

Other quality standards for individual trees should be applied on a site-specific basis.

6. Stocking Standards for Selection Logging Systems

Stocking standards for selection systems are under review.

PP xh1 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at Free Growing (s/ha)	Target Stocking at Regen. Stage (s/ha)	Leader Growth at Free Growing (cm/yr)	Species Preferred	Species Acceptable	Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period Earliest (yrs)	Free Growing Period Latest (yrs)
03	Grasslands											
02	1. SEL 2. AVOID		400	500	15	Py		200	1.40	7	12	15
04, 01 & 05	1. SEL	Py 20 Fd 30	400	500	15	Py	Fd[2]	200	1.40	7	12	15
06	1. SEL 2. (SW)	Py 20 Fd 30	600	700	15	Py	Fd[2]	400	1.50	7	12	15
07	1. SEL 2. (SW) 3. CC - small	Py 20 Fd 30	1000	1100	15	Py Fd		500	1.60	7	12	15
08	1. SEL 2. CC - small	Fd 20	1000	1100	20	Fd Py[3]	(Pl)[4]	500	1.60	7	12	15

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha.

[1] CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.

[2] Not recommended for planting. Better suited on steep north aspects.

[3] Avoid cold air drainage sites.

[4] May be suitable on cold air drainage sites.

PP xh2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02 & 05	Grasslands											
03, 04 & 01	1. SEL	Py 20 Fd 30	400	500	15	Py	Fd[2]	200	1.40	7	12	15
06	1. SEL 2. (SW)	Py 20 Fd 30	600	700	15	Py	Fd	400	1.50	7	12	15
07	1. SEL 2. CC - small	Fd 20 Py 20	1000	1100	20	Fd	Py	500	1.60	7	12	15

Conifer/Brush Ratio = 125%

Maximum density for dry-belt Fd is 4000 s/ha.

[1] CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.

[2] Not recommended for planting. Better suited on steep north aspects.

IDF dk1 Stocking Standards

Site Unit	TARGETS					MINIMUMS						
	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at		Leader Growth at Free Growing (cm/yr)	Species		Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period	
			Free Growing (s/ha)	Regen. Stage (s/ha)		Preferred	Acceptable				Earliest (yrs)	Latest (yrs)
02	1. AVOID 2. SEL	20	400	500	10	Py[2]	Fd[3]	200	1.40	7	12	15
03	1. SEL 2. AVOID	Fd 25 Pl 15 Py 20	600 Pl 800	700 Pl 900	15	Pl Fd[3]	Py[2]	400	1.50	7	12	15
04	1. SEL 2. CC - small 3. (SW)	15	1000 Pl 1200	1100 Pl 1300	20	Fd[3] Pl	Py[2]	500	1.60	7	12	15
01	1. SEL 2. SW 3. CC - medium	15	1000 Pl 1200	1100 Pl 1300	25	Pl Fd[3]	Py[2] (Sxw)[4]	500	1.60	7	12	15
05	1. SEL,SW 2. ST,CC	15	1200	1300	25	Fd[3] Pl	Sxw Py[2]	700	1.60	7	12	15
06	1. CC 2. SEL,SW	15	1000	1100	25	Sxw	Fd[3] Pl	500	1.60	4	9	15
07	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha.

[1] CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.

[2] Lower elevations within subzone, south aspects, nutrient-rich sites, medium soil textures.

[3] Difficult to establish by planting. Risk of frost damage to planted stock. On site units 05 and 06 avoid cold air drainage sites.

[4] Higher elevations within subzone. Not recommended for planting.

IDF dk2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at		Leader Growth at Free Growing (cm/yr)	Species		Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period	
			Free Growing (s/ha)	Regen. Stage (s/ha)		Preferred	Acceptable				Earliest (yrs)	Latest (yrs)
02	1. AVOID 2. SEL	Pl 15 Py 20 Fd 25	600 Pl 800	700 Pl 900	15	Pl Fd[3]	Py[2]	400	1.50	7	12	15
03	1. SEL 2.(SW),(CC -small)	20 Pl 15	1000 Pl 1200	1100 Pl 1300	20	Fd[3] Pl	Py[2]	500	1.60	7	12	15
01	1. SEL 2. SW 3. ST,CC - medium	15	1000 Pl 1200	1100 Pl 1300	25	Pl Fd[3]	(Py)[2] Lw[4]	500	1.60	7	12	15
04	1. SEL 2. SW 3. CC	15	1200 Pl 1400	1300 Pl 1500	25	Fd Pl	Sxw[5] Lw[4]	700	1.70	7	12	15
05	1. CC 2. SW 3. SEL	15	1200 Pl 1400	1300 Pl 1500	25	Sxw Fd[3]	Lw[4] Pl	700	1.60	4	9	15
06 & 07	1. SEL 2. SW 3. (AVOID)	15	1000	1100	20	Sxw Pl		500	1.50	4	9	15
08	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Lower elevations within subzone, south aspects, nutrient-rich sites, medium soil textures.
3. Difficult to establish by planting. Risk of frost damage to planted stock. On site unit 05 avoid cold air drainage sites.
4. North aspects. Outside of natural range, therefore consider small planting trials.
5. North aspects; higher elevations within subzone.

IDF dm1 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	Grasslands											
03	1. SEL	15	600	700	15	Py	Fd[2]	400	1.50	7	12	15
04	1. SEL 2. SW 3. CC - medium 4. (ST)	15	1000	1100	20	Pl Fd	Py[3] (Lw)[4]	500	1.60	7	12	15
01	1. SEL, SW 2. ST 3. CC - medium	12	1000 Pl 1200	1100 Pl 1300	20	Pl Fd Lw		500	1.60	7	12	15
05	1. ST, SEL 2. SW 3. CC	12	1200 Pl 1400	1300 Pl 1500	25	Fd[5] Pl[7]	Lw[6] Sxw[7]	700	1.70	7	12	15
06	1. CC, SW 2. SEL 3. ST	15	1200 Pl 1400	1300 Pl 1500	25	Sxw Fd[5] Lw[6]	Pl[8]	700	1.60	4	9	15
07	1. SEL, SW 2. (AVOID)	15	1000	1100	20	Sxw Pl		500	1.50	4	9	15

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Not recommended for planting.
3. For south aspects only.
4. North aspects.
5. Risk of frost damage to planted stock. On site unit 06 avoid cold air drainage sites.
6. Avoid cold air drainage areas.
7. North aspects; higher elevations within subzone.
8. May be suitable on cold air drainage sites.

IDF mw1 Stocking Standards

TARGETS						MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. SEL 2. SW	15	600 Pl 800	700 Pl 900	15	Py Pl Fd[2]		400	1.50	7	12	15
03	1. SEL 2. SW	15	1000	1100	20	Fd[2] Py	Pl (Lw)	500	1.60	7	12	15
04	1. CC - medium 2. ST 3. SEL, SW	15	1000 Pl 1200	1100 Pl 1300	25	Fd Pl	Lw Py	500	1.60	7	12	15
01 & 01-YC	1. CC - medium 2. (ST, SEL)	12	1200 Pl 1400	1300 Pl 1500	30	Lw Fd Pl	Py[3] (Sxw)[4]	700	1.70	7	12	15
05	1. CC 2. (SW, ST)	12	1200 Pl 1400	1300 Pl 1500	35	Sxw Lw[5] Fd[5]	Pl	700	1.60	4	9	15
06	1. CC	15	1200	1300	30	Sxw	Pl Cw (Fd)[5] (Lw)[5]	700	1.60	4	9	15

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site Units 02 and 03 have Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Difficult to establish by planting.
3. Lower elevations within subzone.
4. Higher elevations within subzone; north aspects.
5. Not on areas subject to flooding, high water table or cold air drainage.

IDF mw2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at		Leader Growth at Free Growing (cm/yr)	Species		Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period	
			Free Growing (s/ha)	Regen. Stage (s/ha)		Preferred	Acceptable				Earliest (yrs)	Latest (yrs)
02	1. SEL 2. SW 3. AVOID	20	600 Pl 800	700 Pl 900	10	Pl Fd[2]	Py[3]	400	1.50	7	12	15
03	1. SEL,SW	15	1000	1100	20	Fd[2] Pl	Py[3]	500	1.60	7	12	15
01, 01-YC & 01-YS	1. CC - medium 2. (ST, SEL)	12	1200 Pl 1400	1300 Pl 1500	30	Fd Pl	Lw[4] (Sxw)[5]	700	1.70	7	12	15
04	1. CC 2. (SW, ST)	12	1200	1300	35	Sxw Fd[6]	Lw[4,6] Pl (Cw)	700	1.60	4	9	15
05	1. AVOID											

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site units 02 and 03 have Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Difficult to establish by planting.
3. Lower elevations within subzone; south aspects.
4. Potential for small trials.
5. Higher elevations within subzone; north aspects.
6. Not on areas subject to flooding, high water table or cold air drainage.

IDF xh1 Stocking Standards

	TARGETS					MINIMUMS						
			Target Stocking at			Species					Free Growing Period	
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Free Growing (s/ha)	Regen. Stage (s/ha)	Leader Growth at Free Growing (cm/yr)	Preferred	Acceptable	Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Earliest (yrs)	Latest (yrs)
02	1. SEL	Py 20 Fd 25	400	500	15	Py	(Fd)[2]	200	1.40	7	12	15
03	1. SEL	Py 20 Fd 25	400	500	15	Py	Fd[2]	200	1.40	7	12	15
04 & 05	1. SEL 2. (SW)	20	600	700	20	Py	Fd[2]	400	1.50	7	12	15
01, 06 & 07	1. SEL,SW 2. CC - small	20	1000	1100	20	Fd[3] Py		500	1.60	7	12	15
08	1. SEL,SW 2. CC - small	15	1200	1300	20	Fd[4]	Pl[5] Lw[6] Py (Sxw)	700	1.60	4	9	15
09	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Not recommended for planting.
3. Difficult to establish by planting.
4. Avoid cold air drainage sites.
5. May be suitable on cold air drainage sites.
6. Higher elevations within subzone; north aspects. Most productive growth on subhygric - rich sites.

IDF xh2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. AVOID 2. (SEL)	Py 20 Fd 25	400	500	10	Py	Fd[2]	200	1.40	7	12	15
03 & 04	1. SEL	Py 20 Fd 25	400	500	15	Py	Fd[2]	200	1.40	7	12	15
05	1. SEL	Py 20 Fd 25	600	700	15	Py	Fd[2]	400	1.50	7	12	15
01	1. SEL 2. SW	20	1000	1100	20	Fd Py		500	1.60	7	12	15
06	1. SEL,SW 2. (CC - small)	15	1000	1100	20	Fd[3] Py		500	1.60	7	12	15
07	1. SEL,SW 2. CC	15	1200	1300	20	Fd[4]	Pl[5] Py (Sxw)	700	1.60	4	9	15
08	1. SEL,SW 2. (AVOID)	15	1000	1100	20	Sxw Pl[5]	(Fd)[4]	500	1.50	4	9	15

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Not recommended for planting.
3. Difficult to establish by planting.
4. Avoid cold air drainage sites.
5. May be suitable on cold air drainage sites.

MSdc Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at Free Growing (s/ha)	Target Stocking at Regen. Stage (s/ha)	Leader Growth at Free Growing (cm/yr)	Species Preferred	Species Acceptable	Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period Earliest (yrs)	Free Growing Period Latest (yrs)
02	1. AVOID 2. SEL 3. (CC-small)	15	1000	1100	15	Pl	Fd[2]	500	1.60	7	12	15
03	1. CC 2. SW, SEL 3. (ST)	15	1000 Pl 1200	1100 Pl 1300	20	Pl Fd[2]	(Sxw)	500	1.60	7	12	15
01	1. CC 2. (SW, ST, SEL)	10	1200 Pl 1400	1300 Pl 1500	25	Sxw Fd[2] Pl	(Bl)[3]	700	1.70	7	12	15
04	1. CC 2. (SW, ST, SEL)	10	1200 Pl 1400	1300 Pl 1500	30	Sxw Pl	Fd[2] Bl	700	1.60	4	9	15
05	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site units 02 and 03 have Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Lower elevations within subzone; south aspects. Not on areas with flooding, high water table or cold air drainage. High risk of frost damage to planted stock.
3. Higher elevations within subzone; north aspects; nutrient-rich sites.

MS dm1 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at Free Growing (s/ha)	Target Stocking at Regen. Stage (s/ha)	Leader Growth at Free Growing (cm/yr)	Species		Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period	
						Preferred	Acceptable				Earliest (yrs)	Latest (yrs)
02	1. AVOID 2. (SEL)	15	1000	1100	15	Pl	Fd[2]	500	1.60	7	12	15
03	1. CC - medium	15	1000	1100	15	Pl	(Fd)[2] (Lw)[3]	500	1.60	7	12	15
04	1. CC - medium 2. SW, SEL 3. (ST)	10	1000 Pl 1200	1100 Pl 1300	20	Pl Fd[2]	Lw[3] Sxw[4]	500	1.60	7	12	15
01	1. CC 2. (ST, SW, SEL)	10	1200 Pl 1400	1300 Pl 1500	25	Pl Sxw	Lw[3] Fd[2] (Bl)[5]	700	1.70	7	12	15
05 & 06	1. CC 2. (ST, SW, SEL)	10	1200 Pl 1400	1300 Pl 1500	30	Sxw Pl	Lw Fd Bl[5]	700	1.60	4	9	15
07	1. AVOID[6] 2. SW, SEL 3. CC - small	10	1000	1100	20	Pl Sxw	Bl[5]	500	1.50	4	9	15
08	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site units 02 and 04 have Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Lower elevations within subzone. Not on areas with flooding, high water table or cold air drainage. High risk of frost damage to planted stock.
3. Lower elevations within subzone; south aspects. Not on areas with flooding or cold air drainage. Risk of frost damage to planted stock.
4. Higher elevations within subzone; north aspects.
5. Higher elevations within subzone; north aspects. Not recommended on site units 05 or 07 if the cover of *Ledum glandulosum* exceeds 5%.
6. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be very difficult. Planted Sxw has a high risk of frost damage.

MS dm2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. AVOID 2. SEL	15	1000	1100	15	Pl	Fd[2]	500	1.60	7	12	15
03	1. CC - medium 2. SW, SEL 3. (ST)	15	1000 Pl 1200	1100 Pl 1300	20	Pl	Fd[2] (Sxw) (Lw)[3]	500	1.60	7	12	15
04 & 01	1. CC 2. (SW, ST, SEL)	10	1200 Pl 1400	1300 Pl 1500	25	Pl Sxw	Fd[2] (Lw)[3] (Bl)[4]	700	1.70	7	12	15
05 & 06	1. CC 2. (SW, ST, SEL)	10	1200 Pl 1400	1300 Pl 1500	30	Sxw Pl	Fd[2] Bl[4]	700	1.60	4	9	15
07	1. AVOID[5] 2. SW, SEL 3. CC - small	10	1000	1100	20	Pl Sxw	Bl	500	1.50	4	9	15

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site units 02 and 03 have Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Lower elevations within subzone; south aspects. Not on areas with flooding, high water table or cold air drainage. High risk of frost damage to planted stock.
3. Outside of natural range. Small planting trials recommended.
4. Higher elevations within subzone; north aspects; nutrient-rich sites.
5. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be very difficult. Planted Sxw has a high risk of frost damage.

MS xk Stocking Standards

Site Unit	TARGETS					MINIMUMS						
	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at		Leader Growth at Free Growing (cm/yr)	Species		Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period	
			Free Growing (s/ha)	Regen. Stage (s/ha)		Preferred	Acceptable				Earliest (yrs)	Latest (yrs)
03 & 04	Grasslands											
02	1. AVOID 2. (SEL, SW) 3. (CC - small)	Pl 15 Fd 20	1000	1100	15	Pl	Fd[2] (Sxw)[3]	500	1.60	7	12	15
05	1. CC - medium 2. SEL, SW 3. (ST)	Pl 15 Fd 20 Sxw 15	1000 Pl 1200	1100 Pl 1300	20	Pl	Fd[2] (Sxw)[3]	500	1.60	7	12	15
01	1. CC	15	1200 Pl 1400	1300 Pl 1500	25	Pl	Sxw Fd[2]	700	1.70	7	12	15
06	1. CC 2. (SW, ST, SEL)	15	1200 Pl 1400	1300 Pl 1500	25	Sxw Pl Fd[2]	(Bl)[4] (Lw)[5]	700	1.70	7	12	15
07 & 08	1. CC 2. (ST, SW, SEL)	15	1200 Pl 1400	1300 Pl 1500	25	Sxw Pl	Fd[2] (Bl)[4]	700	1.60	4	9	15
09	1. AVOID[6] 2. SW, SEL 3. CC - small	15	1000	1100	20	Pl Sxw	Bl	500	1.50	4	9	15

Conifer/Brush Ratio = 125%

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site units 02 and 05 have Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Lower elevations within subzone and south aspects. Not on areas with flooding, high water table or cold air drainage. High risk of frost damage to planted stock. On site units 07 and 08, Fd is not recommended for planting.
3. Higher elevations within subzone; north aspects. Not recommended for planting. May accept natural regeneration.
4. Higher elevations within subzone; north aspects; nutrient-rich sites. Not recommended on site unit 07 if the cover of *Ledum glandulosum* exceeds 5%.
5. Outside of natural range. Small planting trials recommended.
6. Cold air drainage and the high water table will make it very difficult to achieve satisfactory regeneration. Planted Sxw has a high risk of frost damage.

SBS mm Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at		Leader Growth at Free Growing (cm/yr)	Species		Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period	
			Free Growing (s/ha)	Regen. Stage (s/ha)		Preferred	Acceptable				Earliest (yrs)	Latest (yrs)
02	1. CC - small 2. AVOID	12	1000	1100	15	Pl	(Sxw)[2]	500	1.60	7	12	15
03	1. AVOID 2. SW 3. SEL 4. CC - small	12	1000	1100	15	Pl	Fd[3] (Sxw)[2]	500	1.60	7	12	15
04	1. CC 2. SW 3. SEL	12	1000 Pl 1200	1100 Pl 1300	25	Pl	Fd[3] Sxw	500	1.60	7	12	15
05 & 06	1. CC 2. (SW, SEL)	10	1200 Pl 1400	1300 Pl 1500	30	Pl Sxw	Fd[3]	700	1.70	7	12	15
01	1. CC 2. (SW)	10	1200 Pl 1400	1300 Pl 1500	30	Sxw	Pl Bl[4]	700	1.70	7	12	15
07	1. CC 2. (SW)	10	1200 Pl 1400	1300 Pl 1500	35	Sxw	Pl Bl[4] (Cw[5])	700	1.60	4	9	15
08	1. AVOID[6] 2. SW, SEL 3. CC - small	10	1000	1100	20	Pl Sxw	Bl[4]	500	1.50	4	9	15
09	1. AVOID											

Conifer/Brush Ratio = 150%

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site units 03 and 04 have Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Not recommended for planting.
3. Lower elevations within subzone and south aspects.
4. Nutrient-rich sites; higher elevations within subzone. May accept up to 50% well-spaced Bl natural regeneration.
5. Lower elevations within subzone; nutrient-rich sites; north aspects. Not recommended for planting.
6. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be very difficult. Planted Sxw has a high risk of frost damage.

ICH mk1 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at Free Growing (s/ha)	Target Stocking at Regen. Stage (s/ha)	Leader Growth at Free Growing (cm/yr)	Species Preferred	Species Acceptable	Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period Earliest (yrs)	Free Growing Period Latest (yrs)
02	1. AVOID 2. (SEL, SW)	15	600	700	15	Fd	Pl	400	1.50	7	12	15
03	1. CC - medium 2. SW, SEL 3. (ST)	15	1000 Pl 1200	1100 Pl 1300	25	Pl Fd[2]	Lw (Sxw)[3]	500	1.60	7	12	15
04	1. CC 2. ST 3. (SW, SEL)	10	1200 Pl 1400	1300 Pl 1500	30	Lw Fd[2] Pl	(Sxw)[3]	700	1.70	7	12	15
01 & 01-YS	1. CC 2. ST 3. (SW, SEL)	10	1200 Pl 1400	1300 Pl 1500	35	Lw[4] Pl Fd[2] Sxw	(Bl)	700	1.70	7	12	15
05 & 06	1. CC 2. SW 3. (SEL)	10	1200 Pl 1400	1300 Pl 1500	35	Sxw Pl	Lw[4] Fd[2] Bl (Cw)	700	1.60	4	9	15
07	1. AVOID[5] 2. SW, SEL 3. CC - small	10	1000	1100	20	Pl Sxw	Bl	500	1.50	4	9	15
08	Non-forested wetlands											

Conifer/Brush Ratio = 150%

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site units 02 and 03 have Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Lower elevations within subzone; south aspects. Not on areas with flooding, high water table or cold air drainage. Risk of frost damage to planted stock.
3. Higher elevations within subzone; north aspects.
4. Not on cold air drainage areas.
5. Cold air drainage and high water table will make it difficult to achieve regeneration. Planted Sxw has a high risk of frost damage.

ICH mk2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at Free Growing	Target Stocking at Regen. Stage	Leader Growth at Free Growing	Species Preferred	Species Acceptable	Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period Earliest	Free Growing Period Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. AVOID 2. SEL, SW	10	1000	1100	20	Pl Fd		500	1.60	7	12	15
03	1. CC - medium 2. SW 3. ST, SEL	10	1000 Pl 1200	1100 Pl 1300	25	Fd[3] Pl[2]	Lw[4]	500	1.60	7	12	15
04	1. CC	10	1200 Pl 1400	1300 Pl 1500	30	Fd[3] Pl[2]	Sxw Lw[4]	700	1.70	7	9	15
01	1. CC	10	1200 Pl 1400	1300 Pl 1500	35	Sxw Fd[3] Pl[2]	Lw[4] (Bl)[5]	700	1.60	4	9	15
05	1. CC	10	1200 Pl 1400	1300 Pl 1500	35	Sxw	Fd[3] Bl[5] (Cw) (Pl)	700	1.60	4	9	15
06	1. AVOID 2. SW, SEL 3. (CC - small)	10	1000	1100	25	Sxw Pl	Bl (Cw)	500	1.50	4	9	15

Conifer/Brush Ratio = 150%

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Severely disturbed sites or cold air drainage areas.
3. Preferred on south aspects at lower elevations within subzone. Not on areas subject to flooding, high water table or cold air drainage.
4. Outside of natural range, therefore small planting trials recommended.
5. Higher elevations within subzone.

ICH mw2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at Free Growing	Target Stocking at Regen. Stage	Leader Growth at Free Growing	Species Preferred	Species Acceptable	Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period Earliest	Free Growing Period Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. SW,CC - medium 2. (ST, SEL)	10	1000	1100	25	Lw Fd Pl	Py[7]	500	1.60	7	12	15
03	1. CC 2. SW 3. (ST)	10	1200 Pl 1400	1300 Pl 1500	30	Lw Fd[3] Pl[2]	Pw[6] Sxw[4] Py[7]	700	1.70	7	12	15
01 & 01-YS	1. CC	10	1200 Pl 1400	1300 Pl 1500	35	Lw Fd[3] Sxw[4]	Pw[6] Pl (Cw)[8] (Bl)[5] (Hw)[8]	700	1.70	7	12	15
04	1. CC	10	1200 Pl 1400	1300 Pl 1500	35	Sxw Fd[3] Cw	Lw Pl Hw Bl[5] Pw[6]	700	1.60	4	9	15
05	1. CC	10	1200	1300	35	Sxw Cw	Lw Fd Pl Bl[5] Hw (Pw)[6]	700	1.60	4	9	15
06 & 07	1. AVOID 2. SEL,SW 3. (CC - small)	10	1000	1100	25	Sxw Cw	Pl Bl[5] (Pw)[6] (Hw)	500	1.50	4	9	15
08	Non-forested wetlands											
	Conifer/Brush Ratio = 150%											

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site unit 02 has Fd with dry-belt charateristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Severely disturbed sites or cold air drainage areas.
3. Elevations below 1200 m. Not on areas subject to flooding, high water table or cold air drainage, or on steep north aspects.
4. Elevations above 1000 m. Frost tolerance is greater than Fd and Lw.
5. Elevations above 1200 m. Frost tolerance is greater than Fd, Lw, Cw and Hw.
6. Evaluate white pine blister rust and the possibility of cultural control prior to use. Nutrient-rich sites. May have application on *Phellinus*-infected sites.
7. South aspects below 1000 m. Has potential use on *Phellinus*-infected sites.
8. Not recommended for planting or stocking on newly harvested/regenerated areas. May accept new natural regeneration on backlog areas.

ICH mw3 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. AVOID 2. (SEL)	10	1000	1100	20	Pl Fd		500	1.60	7	12	15
03	1. CC - medium 2. SW 3. (ST, SEL)	10	1000 Pl 1200	1100 Pl 1300	25	Pl[2] Fd[3]	Lw[8]	500	1.60	7	12	15
04 & 05	1. CC	10	1200 Pl 1400	1300 Pl 1500	30	Fd[3] Pl	Lw[8] Pw[7] Sxw[4] (Cw)[6]	700	1.70	7	12	15
01 & 01-YC	1. CC	10	1200 Pl 1400	1300 Pl 1500	35	Fd[3] Pl[2] Sxw[4]	Lw[8] Pw[7] (Cw)[6] (Bl)[5] (Hw)	700	1.60	4	9	15
06	1. CC	10	1200	1300	35	Sxw Fd[3] Cw Hw	Pw[7] Lw[8] Bl[5] (Pl)	700	1.60	4	9	15
07	1. CC 2. SW	10	1200	1300	35	Sxw Fd[3] Cw	Lw[8] Bl[5] Hw (Pw)[7]	700	1.60	4	9	15
08	1. AVOID 2. SW, SEL 3. CC - small	10	1000	1100	30	Sxw Cw	Bl[5] Pl (Hw) (Pw)	500	1.50	4	9	15
09	Non-forested wetlands											
	Conifer/Brush Ratio = 150%											

Maximum density for Pl and dry-belt Fd is 4000 s/ha. Site unit 02 has Fd with dry-belt characteristics.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Severely disturbed sites or cold air drainage areas.
3. On south aspects below 1200 m. Not on areas subject to flooding, high water table or cold air drainage, or on steep north aspects.
4. Elevations above 1000 m. Frost tolerance is greater than Fd and Lw.
5. Elevations above 1200 m. Frost tolerance is greater than Fd, Lw, Cw and Hw.
6. Not recommended for planting or stocking on newly harvested/regenerated areas. May accept new natural regeneration on backlog areas.
7. Evaluate white pine blister rust and the possibility of cultural control prior to use. Nutrient-rich sites. May have use on *Phellinus*-infected sites.
8. Outside of natural range, therefore continue small planting trials.

ICHvk1 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at Free Growing (s/ha)	Target Stocking at Regen. Stage (s/ha)	Leader Growth at Free Growing (cm/yr)	Species Preferred	Species Acceptable	Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period Earliest (yrs)	Free Growing Period Latest (yrs)
02	1. CC 2. SW	10	1200 Pl 1400	1300 Pl 1500	25	Fd Pl[2] Pw[6]	Sxw[7,4] Lw[9] (Cw)[7] (Hw)	700	1.70	7	12	15
03 & 04	1. CC 2. (SW)[8]	10	1200 Pl 1400	1300 Pl 1500	30	Fd[3] Sxw[4] Cw Hw	Pw[6] Pl Bl[5]	700	1.60	4	9	15
01	1. CC 2. (SW)[8]	10	1200	1300	35	Sxw[4] Cw	Pw Hw Bl[5] Fd[3] (Pl)	700	1.60	4	9	15
05	1. AVOID[10] 2. SEL,SW[8] 3. CC	10	1000	1100	30	Sxw[4] Cw	Hw Bl[5] (Pw) (Pl)	500	1.50	4	9	15
06	1. AVOID 2. (SEL) 3. (CC - small)	10	1000	1100	25	Sxw[4] Cw Pl	Bl[5] (Pw) (Hw)	500	1.50	4	9	15

Conifer/Brush Ratio = 150%

Maximum density for Pl is 4000 s/ha.

1. CC= Clearcut, ST= Seedtree, SW = Shelterwood, SEL = Selective, AVOID = no harvesting.
2. Severely disturbed sites or cold air drainage areas. Only in areas with lowest snowfall.
3. Preferred on south aspects below 1200 m. Not on areas subject to flooding, high water table, cold air drainage, or on steep north slopes.
4. Elevations above 1000 m. Frost tolerance is greater than Fd and Lw.
5. Elevations above 1100 m. Frost tolerance is greater than Fd, Lw, Cw and Hw.
6. Evaluate white pine blister rust and the possibility of cultural control prior to use. Nutrient-rich sites. May have application on *Phellinus*-infected sites.
7. ONLY if shelterwood harvesting has maintained cover.
8. Shelterwood cutting may be appropriate to control vegetation competition.
9. Outside of natural range, therefore small planting trials.
10. Very difficult to regenerate site unit 05 because of rapid growth of understory vegetation.

ICHwk1 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at		Leader Growth at Free Growing (cm/yr)	Species		Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period	
			Free Growing (s/ha)	Regen. Stage (s/ha)		Preferred	Acceptable				Earliest (yrs)	Latest (yrs)
02	1. CC 2. SW	10	1000 Pl 1200	1100 Pl 1300	25	Pl[2] Fd[3]	Pw[6] Lw[8]	500	1.60	7	12	15
03 & 04	1. CC	10	1200 Pl 1400	1300 Pl 1500	30	Fd[3]	Pl Pw[6] Sxw[4] Lw[8] (Cw) (Hw)	700	1.70	7	12	15
01	1. CC	10	1200	1300	35	Sxw Fd[3] Cw Hw	Pw[6] Lw[8] Bl[5] (Pl)	700	1.60	4	9	15
05	1. CC 2. (SW, SEL)[7]	10	1200	1300	35	Sxw[4] Cw Fd[3]	Hw Bl[5] (Pw)[6] (Pl)	700	1.60	4	9	15
06	1. AVOID 2. SEL, SW 3. CC - small	10	1000	1100	30	Sxw[4] Cw Pl	Bl[5] (Pw)[6] (Hw)	500	1.50	4	9	15
07	1. AVOID 2. (SEL,CC - small)	10	1000	1200	25	Sxw[4] Cw Pl	Bl[5] (Pw)[6] (Hw)	500	1.50	4	9	15
08	Non-forested wetlands											
	Conifer/Brush Ratio = 150%											

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Severely disturbed sites or cold air drainage sites.
3. Preferred on south aspects below 1200 m. Not on areas subject to flooding, high water table, or cold air drainage, or on steep north aspects.
4. Elevations above 1000 m. Frost tolerance is greater than Fd and Lw.
5. Elevations above 1100 m. Frost tolerance is greater than Fd, Lw, Cw and Hw.
6. Evaluate white pine blister rust and the possibility of cultural control prior to use. Nutrient-rich sites. May have application on *Phellinus*-infected sites.
7. Partial cutting may be appropriate to attempt to control vegetation competition.
8. Outside of natural range, therefore small planting trials.

ESSF dc1 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. CC - small 2. (SW) 3. (AVOID)	15	1000	1100	15	Pl	(Se)[2]	500	1.60	7	15	20
03	1. CC - medium 2. (SW)	15	1000 Pl 1200	1100 Pl 1300	20	Pl	(Se)[2]	500	1.60	7	15	20
01	1. CC 2. SW	15	1200	1300	25	Se Pl	(Bl)	700	1.60	4	12	20
04	1. CC 2. SW	15	1200 Pl 1400	1300 Pl 1500	30	Se Pl	Bl	700	1.60	4	12	20
05	1. CC 2. SW	15	1000 Pl 1200	1100 Pl 1300	30	Se Pl	(Bl)[3]	500	1.50	4	12	20
06	1. AVOID[4] 2. SW 3. CC - small	15	1000	1100	20	Pl Se	Bl[3]	500	1.50	4	12	20
07	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Not recommended for planting
3. Is not acceptable on nutrient poor sites, indicated by greater than 5% cover of *Ledum glandulosum*.
4. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be very difficult. Planted Se has a high risk of frost damage.

ESSF dc2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at Free Growing (s/ha)	Target Stocking at Regen. Stage (s/ha)	Leader Growth at Free Growing (cm/yr)	Species Preferred	Species Acceptable	Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period Earliest (yrs)	Free Growing Period Latest (yrs)
02	1. AVOID											
03 & 04	1. CC - medium 2. (SW)	15	1000	1100	15	Pl	(Se)	500	1.60	7	15	20
05	1. CC 2. (SW)	15	1000 Pl 1200	1100 Pl 1300	20	Pl	Se (Bl)[2]	500	1.60	7	15	20
01	1. CC 2. SW	15	1200 Pl 1400	1300 Pl 1500	25	Se Pl	Bl[3]	700	1.60	4	12	20
06	1. SW, CC	15	1200 Pl 1400	1300 Pl 1500	30	Se Pl	Bl	700	1.60	4	12	20
07	1. AVOID[5] 2. SW 3. CC - small	15	1000	1100	20	Pl	Se Bl	500	1.50	4	12	20
08	1. AVOID[5] 2. (SEL, SW)	15	1000	1100	20	Pl Se	(Bl)[4]	500	1.50	4	12	20
09	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Highest elevations within subzone (above 1700 m).
3. Moister, nutrient-rich sites.
4. Is not acceptable on nutrient-poor sites, indicated by greater than 5% cover of *Ledum glandulosum*.
5. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be very difficult. Planted Se has a high risk of frost damage.

ESSF dv Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height (cm)	Target Stocking at Free Growing (s/ha)	Target Stocking at Regen. Stage (s/ha)	Leader Growth at Free Growing (cm/yr)	Species Preferred	Species Acceptable	Minimum Stocking at Free Growing (s/ha)	Minimum Intertree Spacing (m)	Regen Delay (yrs)	Free Growing Period Earliest (yrs)	Free Growing Period Latest (yrs)
02	1. Non-forested											
03	1. AVOID 2. SW 3. (CC - small)	15	1000	1100	15	Pl	(Se)	500	1.60	7	15	20
04	1. CC 2. SW	15	1000 Pl 1200	1100 Pl 1300	20	Pl	Se (Bl)[2]	500	1.60	7	15	20
01	1. CC 2. SW	15	1200 Pl 1400	1300 Pl 1500	30	Pl Se	(Bl)[2]	700	1.60	4	12	20
05	1. CC 2. SW	15	1200 Pl 1400	1300 Pl 1500	30	Se Pl	Bl	700	1.60	4	12	20
06	1. AVOID[3] 2. SW 3. (CC - small)	15	1000	1100	20	Pl Se	Bl	500	1.50	4	12	20

Conifer/Brush Ratio = 125%

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Highest elevations within subzone (above 1700 m).
3. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be very difficult. Planted Se has a high risk of frost damage.

ESSF mw Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. AVOID 2. SW 3. CC - small	15	1000	1100	15	Pl	Fd[2]	500	1.60	7	15	20
03	1. CC - medium 2. SW 3. SEL	15	1000 Pl 1200	1100 Pl 1300	20	Pl	Fd[2] (Se)[3]	500	1.60	7	15	20
04	1. CC 2. SW	15	1200 Pl 1400	1300 Pl 1500	20	Pl Se[3]	(Bl)[4]	700	1.70	7	15	20
01	1. CC 2. SW	15	1200 Pl 1400	1300 Pl 1500	30	Se[3]	Pl Bl[4] (Ba)	700	1.60	4	12	20
05	1. CC 2. SW	15	1200 Pl 1400	1300 Pl 1500	30	Se	Pl Bl (Ba)	700	1.60	4	12	20
06	1. SW 2. CC	15	1200 Pl 1400	1300 Pl 1500	30	Se	Pl[5] Bl Ba	700	1.60	4	12	20
07 & 08	1. SW 2. CC 3. (AVOID)	15	1000	1300	20	Se	Pl[5] Bl Ba	500	1.50	4	12	20

Conifer/Brush Ratio = 125%

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Lowest elevations in subzone; south aspects. Not in areas subject to cold air drainage. Not recommended for planting but natural regeneration is acceptable.
3. Not recommended for planting on coarse-textured glaciofluvial soils.
4. Not acceptable on coarse-textured glaciofluvial soils.
5. Recommended for planting on frost-prone sites but requires moderate to high impact site preparation. Not on north aspects on site unit 06.

ESSF vc Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. AVOID 2. (SW, SEL)	15	1000	1100	15	Se	Pl (Bl)	500	1.60	7	15	20
03	1. CC 2. SW 3. SEL	15	1000	1100	15	Se	Bl Pl[2] (Hm)	500	1.60	7	15	20
01 & 04	1. CC 2. SW 3. SEL	15	1200	1300	15	Se	Bl (Hm)	700	1.60	4	12	20
05	1. SW 2. AVOID[3] 3. CC	15	1000	1100	15	Se	Bl	500	1.50	4	12	20
06	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Acceptable on lower elevation, south slopes. Not recommended for planting.
3. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be very difficult. Planted Se has a high risk of frost damage.

ESSF vv Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. AVOID 2. (SEL, SW)	15	600	700	10	Bl Se	Pl	400	1.50	7	15	20
03	1. SEL, SW 2. AVOID	15	1000	1100	10	Bl Se		500	1.60	7	15	20
01	1. SEL, SW 2. AVOID	15	1000	1100	10	Bl Se		500	1.50	4	12	20
04	1. AVOID 2. SEL, SW	15	600	700	10	Bl Se		400	1.40	4	12	20
05	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.

ESSF wc2 Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
02	1. AVOID 2. CC - small	15	1000	1100	15	Pl	(Se)	500	1.60	7	15	20
03	1. CC 2. SW	15	1000 Pl 1200	1100 Pl 1300	20	Pl Se	(Bl)[2]	500	1.60	7	15	20
04 & 05	1. CC 2. SW, SEL	15	1200 Pl 1400	1300 Pl 1500	25	Se	Pl (Bl)	700	1.70	7	15	20
01	1. CC 2. SW, SEL	15	1200	1300	25	Se	Bl (Pl)	700	1.60	4	12	20
06 & 07	1. CC 2. SW 3. (SEL)	15	1200	1300	20	Se	Bl	700	1.60	4	12	20
08	1. SW 2. AVOID[3] 3. CC - small	15	1000 Pl 1200	1100 Pl 1300	20	Se Pl	Bl	500	1.50	4	12	20
09 & 10	Non-forested wetlands											

Conifer/Brush Ratio = 125%

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Highest elevations within subzone (above 1600 m in the north and 1650 m in the south of the Region).
3. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be difficult. Planted Se has a high risk of frost damage.

ESSF xc Stocking Standards

	TARGETS					MINIMUMS						
Site Unit	Silviculture System[1]	Acceptable Regen. Height	Target Stocking at		Leader Growth at Free Growing	Species		Minimum Stocking at Free Growing	Minimum Intertree Spacing	Regen Delay	Free Growing Period	
			Free Growing	Regen. Stage		Preferred	Acceptable				Earliest	Latest
		(cm)	(s/ha)	(s/ha)	(cm/yr)			(s/ha)	(m)	(yrs)	(yrs)	(yrs)
03 & 04	Grasslands											
02	1. AVOID 2. CC - small 3. (SW)	15	600	700	15	Pl	(Se)[2]	400	1.50	7	15	20
05	1. CC - medium	15	1000	1100	20	Pl	Se[2]	500	1.60	7	15	20
06	1. CC	15	1200	1300	25	Se Pl	(Bl)	700	1.60	4	12	20
01 & 07	1. CC 2. (SW)	15	1200 Pl 1400	1300 Pl 1500	25	Se Pl	Bl	700	1.60	4	12	20
08	1. AVOID[3] 2. (SW) 3. (CC - small)	15	1000	1100	20	Se Pl	Bl	500	1.50	4	12	20
09 & 10	Non-forested wetlands											
	Conifer/Brush Ratio = 125%											

Maximum density for Pl is 4000 s/ha.

1. CC = clearcut, ST = seedtree, SW = shelterwood, SEL = selective, AVOID = no harvesting.
2. Not recommended for planting.
3. Because of cold air drainage and the high water table, achieving satisfactory regeneration will be very difficult. Planted Se has a high risk of frost damage.

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Appendix 1 — A conversion table for biogeoclimatic units in the Kamloops Forest Region

Biogeoclimatic Units	Old Equivalent Biogeoclimatic Units			
	Kamloops Region			Nelson Region
	Mitchell and Green (1981)	Lloyd (1984)	Erickson and Lloyd (1985)	Utzig *et al.* (1986)
BGxh1			BGa3	
BGxh2	PPBGa1			
BGxw1	PPBGa2			
PPxh1	PPBGf2		PPBGd2	
PPxh2	PPBGd			
IDFdk1	IDFb1		IDFb4	
IDFdk1a	IDFb1a			
IDFdk2	IDFd		IDFb3	
IDFdm1			IDFf2	IDFf
IDFmw1			IDFj2	
IDFmw2		IDFj1		
IDFxh1	IDFc		IDFa3	
IDFxh1a			IDFa3a	
IDFxh2	IDFa, IDFc			
IDFxh2a	IDFa1a, IDFc0a			
MSdc	MSb1			
MSdm1			MSb2	MSb2
MSdm2	MSb1		MSc2	
MSxk	MSc		MSc1, MSc2	
SBSmm		SBSm		
ICHmk1			MSb3	ICHc
ICHmk2		ICHe1		
ICHmw2			ICHa3	
ICHmw3		ICHm1		
ICHvk1		ICHv		ICHb
ICHwk1		ICHw		
ESSFdc1			ESSFd3	ESSFe2
ESSFdc2	ESSFe		ESSFe1	
ESSFdv	ESSFe			
ESSFmw	ESSFf			
ESSFvc		ESSFw		ESSFb
ESSFvv		ESSFu		
ESSFwc2		ESSFm1,ESSFm2		
ESSFxc	ESSFd		ESSFd1, d2, d4	

Appendix 2 — Site unit conversion tables

Classification Source	BGC Unit	Site Units

Okanagan Very Dry Hot Bunchgrass

	BGxh1	02	03	-	04	01-MS	01	05	06	07
Erickson & Lloyd (1985)	BGa3	2	3	4A,5A,5	4	1A	1	6	7	8

Thompson Very Dry Hot Bunchgrass

	BGxh2	02	03	04	05	01	06	07	08
Mitchell (1985)	PPBGa1	-	-	-	-	1	-	-	-
Mitchell & Green (1981)	PPBGa1	-	-	-	-	I	-	-	-

Nicola Very Dry Warm Bunchgrass

	BGxw1	02	03	04	01	05	06	07	08	09
Mitchell & Green (1981)	PPBGa2	-	-	-	I	-	-	-	-	-

Okanagan Very Dry Hot Ponderosa Pine

	PPxh1	02	-	03	04	01	05	06	07	08	-
Erickson & Lloyd (1985)	PPBGd2	2	3	-	4	1	5	6	7	-	8
Mitchell & Green (1981)	PPBGf2	Mapped Only – No units described									

Thompson Very Dry Hot Ponderosa Pine

	PPxh2	02	03	04	05	01	06	07	-	-
Mitchell (1985)	PPBGd1	-	4	-	-	1,5	6	-	7	8
Mitchell & Green (1981)	PPBGd	-	III	-	-	IV,V	VI	-	VII	VIII

Site unit conversion tables (cont'd)

Classification Source	BGC Unit	Site Units										

Thompson Dry Cool Interior Douglas-fir

	IDFdk1	02	03	04	01	05	06	-	07
Mitchell (1985)	IDFb1	-	4	3	2,1	5	6	7	-
Erickson & Lloyd (1985)	IDFb4	2	-	3	1	-	4	-	-
Mitchell & Green (1981)	IDFb1	-	I	II	III,IV	V	VI	VII	-

Cascade Dry Cool Interior Douglas-fir

	IDFdk2	02	03	01	04	-	05	06	07	08
Mitchell (1985)	IDFd	2	3	4,1	-	5	6	7	-	-
Erickson & Lloyd (1985)	IDFb3	2	3,4,5	1	-	-	6	-		-
Mitchell & Green (1981)	IDFd	I	II	III,IV	-	V	VI	VII	-	-

Kettle Dry Mild Interior Douglas-fir

	IDFdm1	-	02	03	-	04	01	-	05	06	07	-
Utzig *et al.* (1986)	IDFf	2	-	3	-	-	1	-	4	5		6
Erickson & Lloyd (1985)	IDFf2	-	2	-	3	3,4	1	5	-	6	-	-

Shuswap Moist Warm Interior Douglas-fir

	IDFmw1	02	-	03	04	01	01-YC	05	-	06
Erickson & Lloyd (1985)	IDFj2	-	2A	3	4	1,6	5	-	7A	-

Thompson Moist Warm Interior Douglas-fir

	IDFmw2	02	03	01	01-YC	01-YS	04	05
Lloyd (1984)	IDFj1	2	3	4, 1.MS	1.YC	1.YS	5	6

Site unit conversion tables (cont'd)

Classification Source	BGC Unit	**Site Units**

Okanagan Very Dry Hot Interior Douglas-fir

	IDFxh1	02	03	04	05	01	06	07	08	-	09	-
Erickson & Lloyd (1985)	IDFa3	-	3,4	5,2	6,7	1	8	9	-	-	-	-
Mitchell & Green (1981)	IDFc	-	II	I	-	-	III	-	-	IV	-	V

Thompson Very Dry Hot Interior Douglas-fir

	IDFxh2	02	03	04	-	05	01	06	07	08
Mitchell (1985)	IDFa1	2	3	5	-	6	4, 1	-	7,8	9
Mitchell & Green (1981)	IDFa	I	II	III	-	IV	V,VI	-	VII,VIII	IX
Mitchell & Green (1981)	IDFc	-	-	II	I	-	-	III	IV	V

Dry Cold Montane Spruce

	MSdc	02	03	01	04	-	-	05
Mitchell (1985)	MSb1	2	3	1	4	5	6	-
Mitchell & Green (1981)	MSb1	I	II	III	IV	V	V1	-

Okanagan Highlands Dry Mild Montane Spruce

	MSdm1	-	02	03	04	01	05	06	07	-	08
Utzig *et al.* (1986)	MSb2	-	-	2	-	1, 3	4	5	6	-	7
Erickson & Lloyd (1985)	MSb2	2	-	4	3	5,1	6	7	8	9	10

Site unit conversion tables (cont'd)

Classification Source	BGC Unit	Site Units

Thompson Plateau Dry Mild Montane Spruce

	MSdm2	02	03	04	01	05	06	07	-
Mitchell (1985)	MSb1	-	2	3	1	4	5	6	-
Erickson & Lloyd (1985)	MSc2	2	3	4	1	6	7	-	-
Mitchell & Green (1981)	MSb1	-	I	II	III	IV	VI	V	VII

Very Dry Cool Montane Spruce

	MSxk	02	03	-	04	05	01	06	07	08	09
Mitchell (1985)	MSc	4,5	-	2	3	7	1	6	8,10	9	11
Erickson & Lloyd (1985)	MSc1	4,5	2	-	3	7	1	6	8,10	9	11
Erickson & Lloyd (1985)	MSc2	3	2	-	-	4	1	5	-	6	-
Mitchell & Green (1981)	MSc	I (II)	-	-	-	(II)	IV	(II)	III,VI,VIII	V	VII,IX

Moist Mild Sub-Boreal Spruce

	SBSmm	02	03	04	05	06	01	07	08	09
Lloyd (1984)	SBSm	2	3	4	5.1	5.2	1	6	7	8

Kootenay Moist Cool Interior Cedar-Hemlock

	ICHmk1	02	03	04	01	01-YS	05	06	07	-	08
Utzig *et al.* (1986)	ICHc	2	3	4	1,5	-	6	7	-	8	9
Erickson & Lloyd (1985)	MSb3	2	-	3,4	1	-	5	-	-	-	-

Site unit conversion tables (cont'd)

Classification Source	BGC Unit	Site Units

Thompson Moist Cool Interior Cedar-Hemlock

	ICHmk2	02	03	04	01	05	06
Lloyd (1984)	ICHe1	2	3	4	5,1	6	7

Shuswap Moist Warm Interior Cedar-Hemlock

	ICHmw2	02	03	01-YS	01	04	05	06	07	08
Erickson & Lloyd (1985)	ICHa3	2	3	4	1	5	6	-	-	7

	ICHmw3	02	03	04	05	01	01-YC	06	07	08	09
Lloyd (1984)	ICHm1	2	3	4	5	1-MC	1-YC	-	6	7	8

Mica Very Wet Cool Interior Cedar-Hemlock

	ICHvk1	02	03	04	01	05	06
Lloyd (1984)	ICHv	2	3	4.1,4.2	1	5	6

Wells Gray Wet Cool Interior Cedar-Hemlock

	ICHwk1	02	03	04	01	05	06	07	08
Lloyd (1984)	ICHw	2	3	4	1	5	6	7	8

Okanagan Highlands Dry Cold Engelmann Spruce-Subalpine Fir

	ESSFdc1	02	03	01	04	05	06	07	-
Utzig *et al.* (1986)	ESSFe2	-	2	1	-	3	4	-	5
Erickson & Lloyd (1985)	ESSFd3	-	2, 3,1	4	6	5, 7	8	9	10

Site unit conversion tables (cont'd)

Classification Source	BGC Unit	Site Units

Thompson Plateau Dry Cold Engelmann Spruce-Subalpine Fir

	ESSFdc2	02	03	04	05	-	01	06	07	08	-	09	-
Mitchell (1985)	ESSFe1	(3)	2	-	-	5	1,6,4	-	7, 9	-	8	-	-
Erickson & Lloyd (1985)	ESSFe1	Mapped only - description from Mitchell & Green (1981)											
Mitchell & Green (1981)	ESSFe	(II)	I	-	-	IV	V,VI,III	-	VII,VIII	-	IX	-	X

Dry Very Cold Engelmann Spruce-Subalpine Fir

	ESSFdv	-	02	03	04	-	01	05	-	06
Mitchell & Green (1981)	ESSFe	I	-	II	III	IV	VI	V,VII ,VIII	IX	X

Moist Warm Engelmann Spruce-Subalpine Fir

	ESSFmw	02	-	-	03	04	01	05	06	07	-	08
Mitchell (1985)	ESSFf	-		2	3	4	5	1	-	6	7	8
Mitchell & Green (1981)	ESSFf	-	I	II	III	IV	V	-	VI	VII	VIII	-

Very Wet Cold Engelmann Spruce-Subalpine Fir

	ESSFvc	02	03	01	04	05	06	-
Utzig *et al.* (1986)	ESSFb	2	-	3,1	4	5	6	7
Lloyd (1984)	ESSFw	2	3	4,1	5	6	7	-

Very Wet Very Cold Engelmann Spruce-Subalpine Fir

	ESSFvv	02	03	01	04	05
Lloyd (1984)	ESSFu	2	3, 4	1	6	7

Site unit conversion tables (cont'd)

Classification Source	BGC Unit	Site Units

Monashee Wet Cold Engelmann Spruce-Subalpine Fir

	ESSFwc2	-	02	03	04	05	01	06	07	08	09	10
Lloyd (1984)	ESSFm1	-	2	3	4	-	1.1	1.2	5	6	7	-
Lloyd (1984)	ESSFm2	2	-	-	5	4.3	1.2	1.1	6	7	8	-

Very Dry Cold Engelmann Spruce-Subalpine Fir

	ESSFxc	02	03	-	04	05	06	01	-	07	08	09		10
Mitchell (1985)	ESSFd1	4	2	-	3	-	5	1	-	6	7		8	
Erickson & Lloyd (1985)	ESSFd1	4	2	-	3	-	6	1	-	6	7		8	
Erickson & Lloyd (1985)	ESSFd2	2	-	-	-	4,1	3	-	-	5	6		7	
Erickson & Lloyd (1985)	ESSFd4	3	-	2	-	4A,4	5	1	6	7	-		8	
Mitchell & Green (1981)	ESSFd	I	-	-		-	II	III	-	IV	V		VI	

Appendix 3 — Common plant species of the Kamloops Forest Region

Scientific Name	Common Name
Abies amabilis	amabilis fir
Abies lasiocarpa	subalpine fir
Acer glabrum	Douglas maple
Achillea millefolium	yarrow
Actaea rubra	baneberry
Agoseris glauca	pale agoseris
Agropyron spicatum	bluebunch wheatgrass
Allium cernuum	nodding onion
Alnus incana ssp. *tenuifolia*	mountain alder
Alnus viridis ssp. *sinuata*	Sitka alder
Amelanchier alnifolia	saskatoon
Antennaria dimorpha	low pussytoes
Antennaria microphylla	rosy pussytoes
Antennaria neglecta	field pussytoes
Antennaria pulcherrima ssp. *anaphaloides*	tall pussytoes
Antennaria racemosa	racemose pussytoes
Antennaria umbrinella	umber pussytoes
Apocynum androsaemifolium	spreading dogbane
Apocynum cannabinum	hemp dogbane
Arabis holboellii	Holboell's rockcress
Aralia nudicaulis	wild sarsaparilla
Arctostaphylos uva-ursi	kinnikinnick
Arenaria capillaris	thread-leaved sandwort
Aristida longiseta	red three-awn
Arnica cordifolia	heart-leaved arnica
Arnica latifolia	mountain arnica
Artemisia campestris	northern wormwood
Artemisia dracunculus	tarragon
Artemisia frigida	pasture sage
Artemisia tridentata	big sagebrush
Artemisia tridentata ssp. *vaseyana*	Vasey's big sagebrush
Artemisia tripartita	threetip sagebrush
Asclepias speciosa	showy milkweed
Aster conspicuus	showy aster
Astragalus miser	timber milk-vetch
Athyrium filix-femina	lady fern
Aulacomnium palustre	glow moss

Balsamorhiza sagittata	arrow-leaved balsamroot
Barbilophozia lycopodioides	common leafy liverwort
Betula glandulosa	scrub birch
Betula occidentalis	water birch
Betula papyrifera	paper birch
Brachythecium albicans	lawn moss
Bromus tectorum	cheatgrass
Calamagrostis canadensis	bluejoint
Calamagrostis rubescens	pinegrass
Calochortus macrocarpus	sagebrush mariposa lily
Caltha leptosepala	white marsh-marigold
Carex aquatilis	water sedge
Carex concinnoides	northwestern sedge
Carex disperma	soft-leaved sedge
Carex lanuginosa	woolly sedge
Carex nigricans	black alpine sedge
Carex rostrata	beaked sedge
Cassiope mertensiana	white mountain-heather
Castilleja miniata	common red paintbrush
Castilleja thompsonii	Thompson's paintbrush
Ceanothus velutinus	snowbrush
Cerastium arvense	field chickweed
Chimaphila umbellata	prince's pine
Chrysothamnus nauseosus	rabbit-brush
Cinna latifolia	nodding wood-reed
Circaea alpina	enchanter's nightshade
Clematis ligusticifolia	white clematis
Clematis occidentalis	blue clematis
Clintonia uniflora	queen's cup
Collinsia parviflora	small-flowered blue-eyed Mary
Collomia linearis	narrow-leaved collomia
Comandra umbellata	pale comandra
Cornus canadensis	bunchberry
Cornus sericea	red-osier dogwood
Crataegus douglasii	black hawthorn
Crepis atrabarba	slender hawksbeard
Cystopteris fragilis	fragile fern
Dactylis glomerata	orchardgrass
Danthonia spicata	poverty oatgrass
Dicranum fuscescens	curly heron's-bill moss
Disporum hookeri	Hooker's fairybells
Disporum trachycarpum	rough-fruited fairybells
Distichlis stricta	alkali saltgrass
Dryopteris assimilis	spiny wood fern

Elaeagnus commutata	wolf-willow
Elymus cinereus	giant wildrye
Elymus glaucus	blue wildrye
Empetrum nigrum	crowberry
Equisetum arvense	common horsetail
Equisetum hyemale	scouring-rush
Equisetum scirpoides	dwarf scouring-rush
Equisetum sylvaticum	wood horsetail
Erigeron compositus	cut-leaved daisy
Erigeron corymbosus	long-leaved fleabane
Erigeron filifolius	thread-leaved fleabane
Erigeron linearis	line-leaved fleabane
Erigeron peregrinus	subalpine daisy
Erigeron speciosus	showy fleabane
Eriogonum heracleoides	parsnip-flowered buckwheat
Eriogonum niveum	snow buckwheat
Eriophorum angustifolium	narrow-leaved cotton-grass
Erophila verna	spring whitlow-grass
Festuca idahoensis	Idaho fescue
Festuca occidentalis	western fescue
Festuca scabrella	rough fescue
Fragaria vesca	wood strawberry
Fragaria virginiana	wild strawberry
Fragaria virginiana ssp. *glauca*	blue-leaved strawberry
Gaillardia aristata	brown-eyed Susan
Galium boreale	northern bedstraw
Galium triflorum	sweet-scented bedstraw
Geranium viscosissimum	sticky geranium
Geum triflorum	old man's whiskers
Goodyera oblongifolia	rattlesnake-plantain
Grindelia squarrosa	curly-cup gumweed
Gymnocarpium dryopteris	oak fern
Heracleum sphondylium	cow-parnsip
Heuchera cylindrica	round-leaved alumroot
Hieracium albertinum	western hawkweed
Hieracium albiflorum	white-flowered hawkweed
Hordeum jubatum	foxtail barley
Hylocomium splendens	step moss
Juncus arcticus	arctic rush
Juncus mertensianus ssp. *gracilis*	Nevada rush
Juniperus communis	common juniper
Juniperus scopulorum	Rocky Mountain juniper
Kalmia microphylla ssp. *microphylla*	alpine bog-laurel
Kalmia microphylla ssp. *occidentalis*	bog-laurel

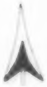
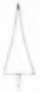
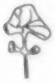
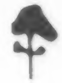
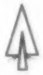
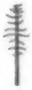
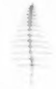
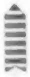
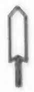
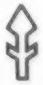
Larix occidentalis	western larch
Ledum glandulosum	trapper's tea
Ledum groenlandicum	Labrador tea
Leptarrhena pyrolifolia	leatherleaf saxifrage
Ligusticum canbyi	Canby's lovage
Lilium columbianum	tiger lily
Linnaea borealis	twinflower
Listera cordata	heart-leaved twayblade
Lithospermum ruderale	lemonweed
Lomatium dissectum	fern-leaved desert-parsley
Lomatium macrocarpum	large-fruited desert-parsley
Lomatium triternatum	narrow-leaved desert-parsley
Lonicera ciliosa	western trumpet honeysuckle
Lonicera involucrata	black twinberry
Lonicera utahensis	Utah honeysuckle
Luetkea pectinata	partridgefoot
Lupinus arcticus	arctic lupine
Lupinus sericeus	silky lupine
Luzula hitchcockii	smooth woodrush
Luzula parviflora	small-flowered woodrush
Lycopodium annotinum	stiff clubmoss
Lysichiton americanum	skunk cabbage
Mahonia aquifolium	tall Oregon-grape
Melampyrum lineare	cow-wheat
Menyanthes trifoliata	buckbean
Menziesia ferruginea	false azalea
Mitella breweri	Brewer's mitrewort
Mitella nuda	common mitrewort
Mitella pentandra	five-stamened mitrewort
Mnium	leafy moss
Moneses uniflora	single delight
Oplopanax horridus	devil's club
Opuntia fragilis	brittle prickly-pear cactus
Orthilia secunda	one-sided wintergreen
Oryzopsis asperifolia	rough-leaved ricegrass
Osmorhiza chilensis	mountain sweet-cicely
Oxytropis campestris	field locoweed
Parnassia fimbriata	fringed grass-of-Parnassus
Paxistima myrsinites	falsebox
Pedicularis bracteosa	bracted lousewort
Pedicularis racemosa	sickletop lousewort
Penstemon confertus	yellow penstemon
Penstemon fruticosus	shrubby penstemon
Penstemon procerus	small-flowered penstemon

Petasites palmatus	palmate coltsfoot
Phacelia linearis	thread-leaved phacelia
Philadelphus lewisii	mock-orange
Phyllodoce empetriformis	pink mountain-heather
Phlox longifolia	long-leaved phlox
Picea engelmannii	Engelmann spruce
Picea glauca x *engelmannii*	hybrid white spruce
Pinus albicaulis	whitebark pine
Pinus contorta var. *latifolia*	lodgepole pine
Pinus monticola	western white pine
Pinus ponderosa	ponderosa pine / yellow pine
Plantago patagonica	Indian-wheat
Platanthera dilatata	white bog-orchid
Pleurozium schreberi	red-stemmed feathermoss
Poa canbyi	Canby's bluegrass
Poa pratensis	Kentucky bluegrass
Poa sandbergii	Sandberg's bluegrass
Polytrichum juniperinum	juniper haircap moss
Polytrichum piliferum	awned haircap moss
Populus balsamifera ssp. *trichocarpa*	black cottonwood
Populus tremuloides	trembling aspen
Potentilla diversifolia	diverse-leaved cinquefoil
Potentilla glandulosa	sticky cinquefoil
Potentilla gracilis	graceful cinquefoil
Potentilla palustris	marsh cinquefoil
Prunus emarginata	bitter cherry
Prunus virginiana	choke cherry
Pseudotsuga menziesii var. *glauca*	interior Douglas-fir
Ptilium crista-castrensis	knight's plume
Pulsatilla occidentalis	western pasqueflower
Purshia tridentata	antelope-brush
Pyrola asarifolia	pink wintergreen
Pyrola chlorantha	green wintergreen
Ranunculus glaberrimus	sagebrush buttercup
Ranunculus uncinatus	little buttercup
Rhacomitrium canescens	grey frayed-cap moss
Rhododendron albiflorum	white-flowered rhododendron
Rhus glabra	sumac
Rhytidiadelphus loreus	lanky moss
Rhytidiadelphus triquetrus	electrified cat's-tail moss
Rhytidiopsis robusta	pipecleaner moss
Ribes bracteosum	stink currant
Ribes cereum	squaw currant
Ribes lacustre	black gooseberry

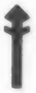
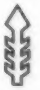
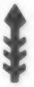
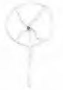
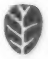
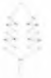
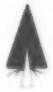
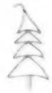
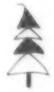
Rosa acicularis	prickly rose
Rosa gymnocarpa	baldhip rose
Rosa nutkana	Nootka rose
Rosa woodsii	prairie rose
Rubus arcticus	dwarf nagoonberry
Rubus parviflorus	thimbleberry
Rubus pedatus	five-leaved bramble
Rubus pubescens	trailing raspberry
Salix barclayi	Barclay's willow
Salix bebbiana	Bebb's willow
Salix glauca	grey-leaved willow
Salix planifolia	tea-leaved willow
Salix scouleriana	Scouler's willow
Sambucus cerulea	blue elderberry
Sambucus racemosa	red elderberry
Sanguisorba canadensis	Sitka burnet
Saxifraga bronchialis	spotted saxifrage
Saxifraga ferruginea	Alaska saxifrage
Sedum lanceolatum	lance-leaved stonecrop
Sedum stenopetalum	worm-leaved stonecrop
Selaginella densa	compact selaginella
Senecio pseudaureus	streambank butterweed
Senecio triangularis	arrow-leaved groundsel
Shepherdia canadensis	soopolallie
Smilacina racemosa	false Solomon's-seal
Smilacina stellata	star-flowered false Solomon's-seal
Solidago canadensis	Canada goldenrod
Sorbus scopulina	western mountain-ash
Sorbus sitchensis	Sitka mountain-ash
Sphagnum	sphagnum
Sphagnum capillaceum	common red sphagnum
Spiraea betulifolia	birch-leaved spirea
Spiraea pyramidata	pyramid spirea
Sporobolus cryptandrus	sand dropseed
Stipa comata	needle-and-thread grass
Stipa hymenoides	Indian-ricegrass
Stipa occidentalis	stiff needlegrass
Stipa richardsonii	spreading needlegrass
Streptopus amplexifolius	clasping twistedstalk
Streptopus roseus	rosy twistedstalk
Symphoricarpos albus	common snowberry
Taraxacum officinale	common dandelion
Taxus brevifolia	western yew
Tetradymia canescens	gray horsebrush

Thalictrum occidentale	western meadowrue
Thuja plicata	western redcedar
Tiarella unifoliata	one-leaved foamflower
Toxicodendron rydbergii	poison-ivy
Tragopogon dubius	yellow salsify
Trichophorum cespitosum	tufted clubrush
Trientalis latifolia	broad-leaved starflower
Trollius laxus	globeflower
Tsuga heterophylla	western hemlock
Tsuga mertensiana	mountain hemlock
Typha latifolia	cattail
Vaccinium caespitosum	dwarf blueberry
Vaccinium membranaceum	black huckleberry
Vaccinium myrtilloides	velvet-leaved blueberry
Vaccinium ovalifolium	oval-leaved blueberry
Vaccinium oxycoccos	bog cranberry
Vaccinium scoparium	grouseberry
Vahlodea atropurpurea	mountain hairgrass
Valeriana sitchensis	Sitka valerian
Veratrum viride	Indian hellebore
Veronica wormskjoldii	alpine speedwell
Viburnum edule	highbush-cranberry
Vicia americana	American vetch
Viola canadensis	Canada violet
Viola glabella	stream violet
Viola orbiculata	round-leaved violet
Vulpia octoflora	six-weeks fescue
Zigadenus elegans	mountain death-camas
Zigadenus venenosus	meadow death-camas

Appendix 4 — Tree species symbols and schematic figures for the Kamloops Forest Region

Scientific name	Common name	Symbol	Schematic
Abies amabilis	amabilis fir	Ba	
Abies lasiocarpa	subalpine fir	Bl	
Betula papyrifera	paper birch	Ep	
Betula occidentalis	water birch	Ew	
Chamaecyparis nootkatensis	yellow-cedar	Yc	
Larix lyallii	alpine larch	La	
Larix occidentalis	western larch	Lw	
Picea engelmannii	Engelmann spruce	Se	
Picea engelmannii x *glauca*	hybrid white spruce	Sxw	
Picea glauca	white spruce	Sw	
Picea mariana	black spruce	Sb	
Pinus albicaulis	whitebark pine	Pa	

Tree species symbols and schematic figures for the Kamloops Forest Region (cont'd)

Scientific name	Common name	Symbol	Schematic
Pinus contorta	lodgepole pine	Pl	
Pinus monticola	western white pine	Pw	
Pinus ponderosa	ponderosa pine	Py	
Populus tremuloides	trembling aspen	At	
Populus balsamifera ssp. *trichocarpa*	black cottonwood	Act	
Pseudotsuga menziesii	Douglas-fir	Fd	
Thuja plicata	western redcedar	Cw	
Tsuga heterophylla	western hemlock	Hw	
Tsuga mertensiana	mountain hemlock	Hm	

Appendix 5 — Key for estimating soil texture in the field[1]

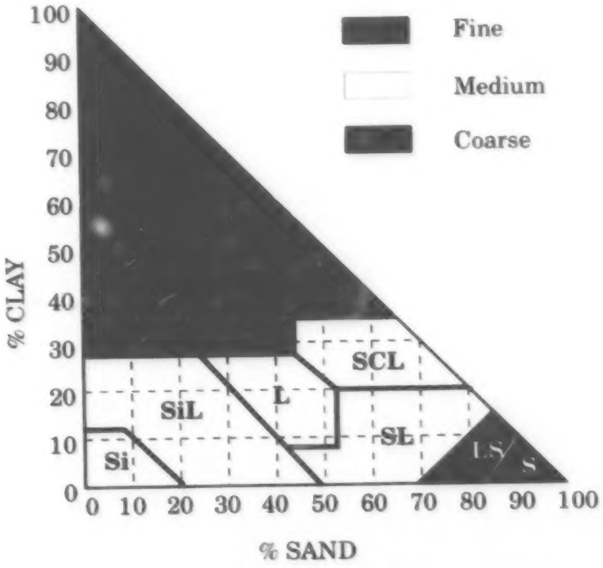
Soil texture refers to the relative proportions of sand, silt and clay particles within a soil. These particles, collectively called the fine fraction, are all less than 2 mm in diameter.

Coarse fragments consist of particles greater than 2 mm in diameter. They are estimated visually as a percentage of the whole soil: % coarse fragments + % fine fraction = 100% (total soil).

The names of the various soil texture classes, as shown on the textural triangle, represent combinations of the dominant particle sizes. For example, a soil with 30% sand, 50% clay (and therefore 20% silt) has a clay soil texture. Loams are composed of a relatively even mix of sand, silt and clay.

The relative proportion of fine fraction particles is estimated through the use of their unique properties of "feel". Sand can always be felt as individual grains, but silt and clay generally cannot. Dry silt feels floury and wet silt is slippery or soapy, but not sticky. Clay forms hard lumps when dry, is very sticky when wet, and plastic (like Plasticine) when moist.

Most soils are a mixture of sand, silt and clay, so the graininess, slipperiness or stickiness depends on the proportion of each particle size that is present. As the amount of clay increases, soil particles bind together better and form longer, stronger "worms". As the sand and silt content increases, soil binding strength and stickiness decrease, and only weak to moderately strong worms can be formed.



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[1] Modified from B.C. Ministry of Forests, Information Leaflet 238, and B.C. Ministry of Forests and Lands (1987).

Key for estimating soil texture in the field (cont'd)

Various tests are available to assist in the field determination of soil texture. These tests should be used in conjunction with the accompanying key.

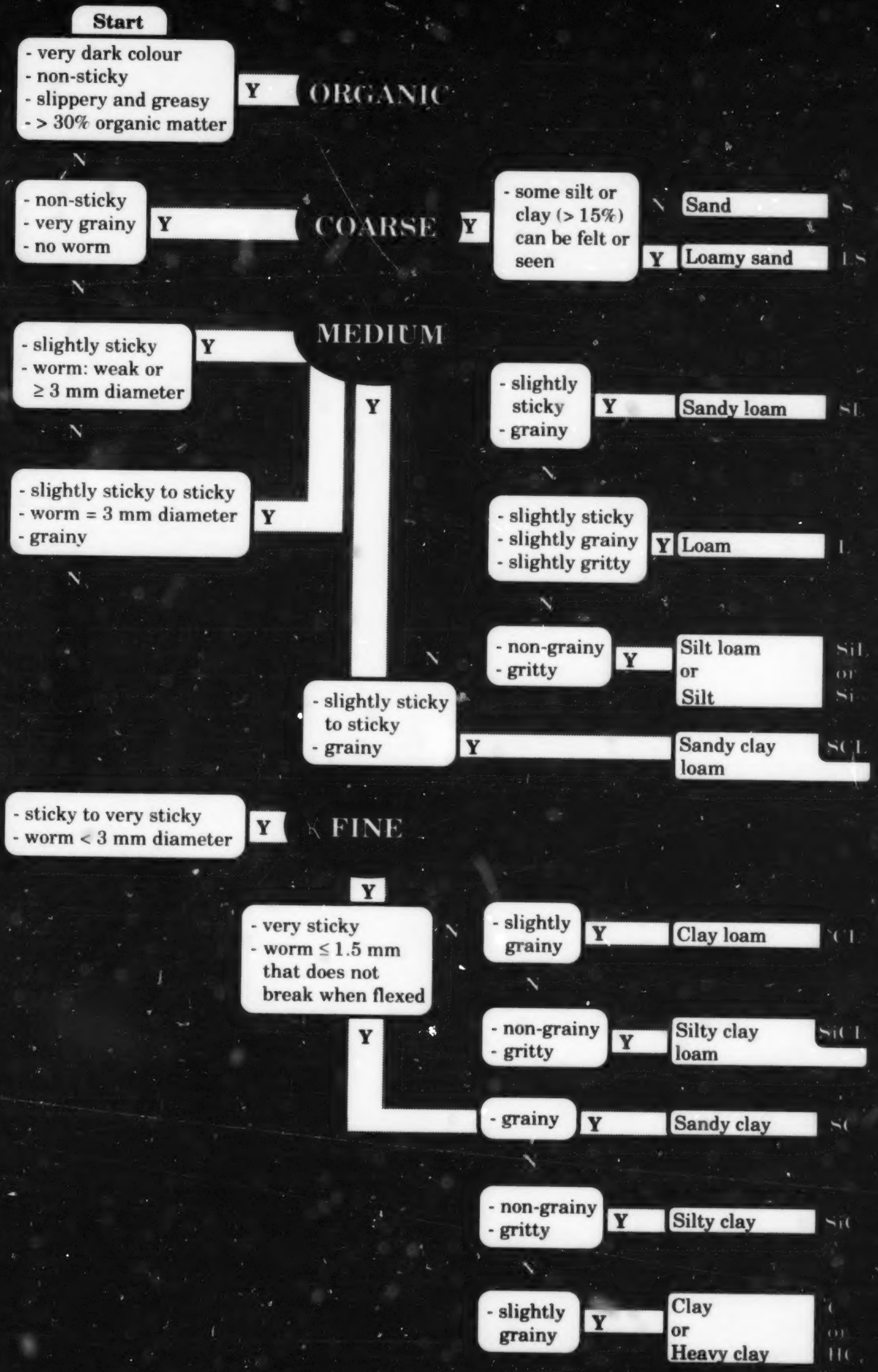
1. **Graininess Test**: Rub the soil between your fingers. If sand is present, the soil will feel "grainy".
   - Nongrainy: Few or no grains can be felt (less than 20% sand).
   - Slightly grainy: Some grains can be felt, but non-grainy material (silt and clay) is dominant (20-50% sand).
   - Grainy: Sand is the dominant material felt. Some non-grainy material can be felt between sand grains (50-80% sand).
   - Very grainy: Sand is the only material that is felt. Little or no non-grainy material is present (greater than 80% sand).
2. **Stickiness Test:** Wet the soil thoroughly and compress between thumb and forefinger. The degree of stickiness is determined by how strongly the soil adheres to the thumb and forefinger after pressure is released, and by how much it stretches. Stickiness increases with clay content.
   - Nonsticky: Practically no soil material adheres to the thumb and forefinger (less than 10% clay).
   - Slightly sticky: Soil material adheres only to one of the fingers and comes off the other rather cleanly. The soil does not stretch appreciably when fingers are separated (less than 25% clay).
   - Sticky: Soil material adheres to both fingers and stretches slightly before breaking when fingers are pulled apart (25-40% clay).
   - Very sticky: Soil putty adheres strongly to both fingers and stretches distinctly before breaking (greater than 40% clay).
3. **Worm Test**: Roll some moist soil between the palms of your hands to form the longest, thinnest worm possible. Worms should be rolled to a length of approximately 5 cm. The more clay there is in the soil, the longer, thinner and more durable the worm will be.
4. **Taste Test**: Work a small amount of soil between your front teeth. Silt particles are distinguished as fine "grittiness", unlike sand, which is distinguished as individual grains (i.e. graininess). Clay has absolutely no grittiness at all.

Key for estimating soil texture in the field (cont'd)

Well decomposed **organic matter** (humus) imparts silt-like properties to the soil. It feels floury when dry and slippery when moist, but **not** sticky and **not** plastic. However, when subjected to the taste test, it feels non-gritty. It is generally very dark when moist or wet, and stains the hands brown or black. Humus-enriched soils often occur on wet sites and on grasslands. Humus is **not** used as a determinant of soil texture; an estimate of the silt content of any humus-enriched mineral soil should be reduced accordingly.

"Organic" soil samples contain more than 30% organic matter. Soil texture is **not** determined on organic samples. Most organic soils and deep organic horizons are found on wet sites (often in depressions or on floodplains) and in association with a dense moss cover (frequently *Sphagnum* spp.).

Key for estimating soil texture in the field (cont'd)



Appendix 6 — A soil classification key, to the great group level[1]

This key was devised to aid field staff in classifying soils that may occur in the Kamloops Forest Region. Soils may be classified to the order or great group level of the Canadian system of soil classification. Soil horizons important in classifying soils are defined below.

Designation	Definition
Ah	dark-coloured, mineral surface horizon enriched with organic matter
Ae	light-coloured, near surface horizon from which iron, aluminum, organic matter and clay have been removed.
Ahe	dark gray-streaked surface horizon enriched with organic matter and depleted of iron and aluminum.
Bf	dark reddish brown to red subsurface horizon, enriched with iron and aluminium.
Bhf	reddish brown subsurface horizon, enriched with iron, aluminium and organic matter.
Bt	brownish subsurface horizon enriched with clay that has moved from a horizon above.
Bg	horizon with blue-gray colours and/or mottling (rust coloured patches), indicative of permanent or periodic anaerobic saturation (gleyed).
Bm	brownish subsurface horizon with only slight additions of iron, aluminium or clay.
j	used with suffixes e, f, g and t to indicate criteria for that suffix are weakly expressed and do not meet specified limits, e.g. Bfj, Btgj.
Of, Om, Oh	organic horizons developed mainly from mosses, sedges, rushes and woody materials under poor drainage conditions. The state of decomposition is denoted by: • f - fibric, poorly decomposed • m - mesic, moderately decomposed • h - humus, well decomposed.

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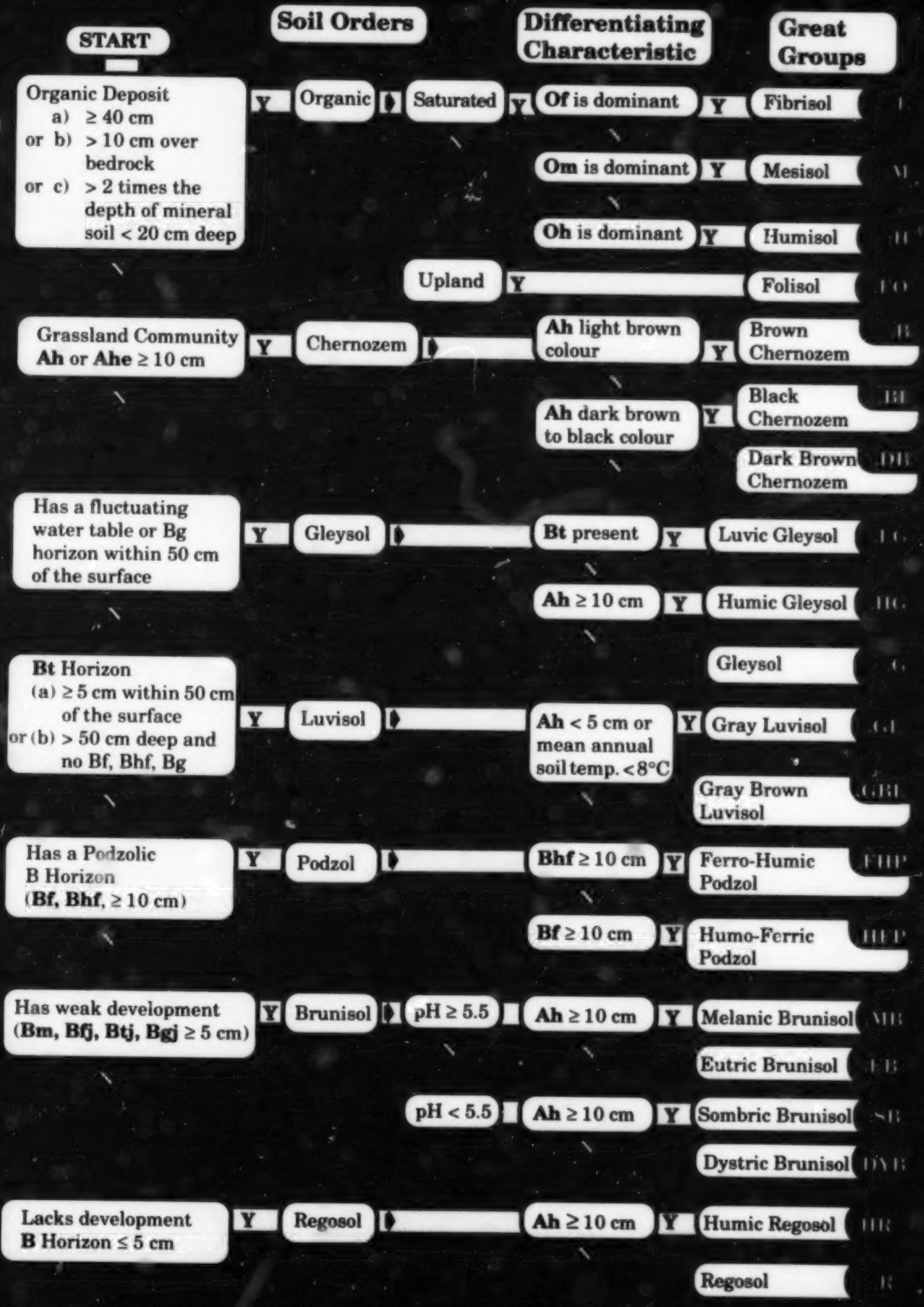
[1] After Agriculture Canada Expert Committee on Soil Survey (1987)

A soil classification key, to the great group level (cont'd)



Appendix 7 — A key for identifying humus forms[1]

This key assists users in identifying humus forms to either the order or great group level, through the use of readily observable forest floor characteristics. Humus forms are recognized at the great group level because differences at this level reflect site characteristics, which in turn affect operational prescriptions.

Term	Definition
Ah horizon	a mineral horizon formed at or near the soil surface and enriched with organic matter.
L horizon	the litter layer, consisting of relatively fresh residues of foliage, twigs, wood and dead moss.
F horizon	a horizon in which plant residues are partially decomposed.
H horizon	a horizon dominated by well- decomposed organic material; the original structure is no longer recognizable.
Fungal mycelia	a mass of thread-like filaments that constitute the "vegetative" phase of fungal development; many are brown, black, grey, white, red or yellow; others are transparent.
Fibrous	contains an abundance of plant residues which do not break down upon rubbing.

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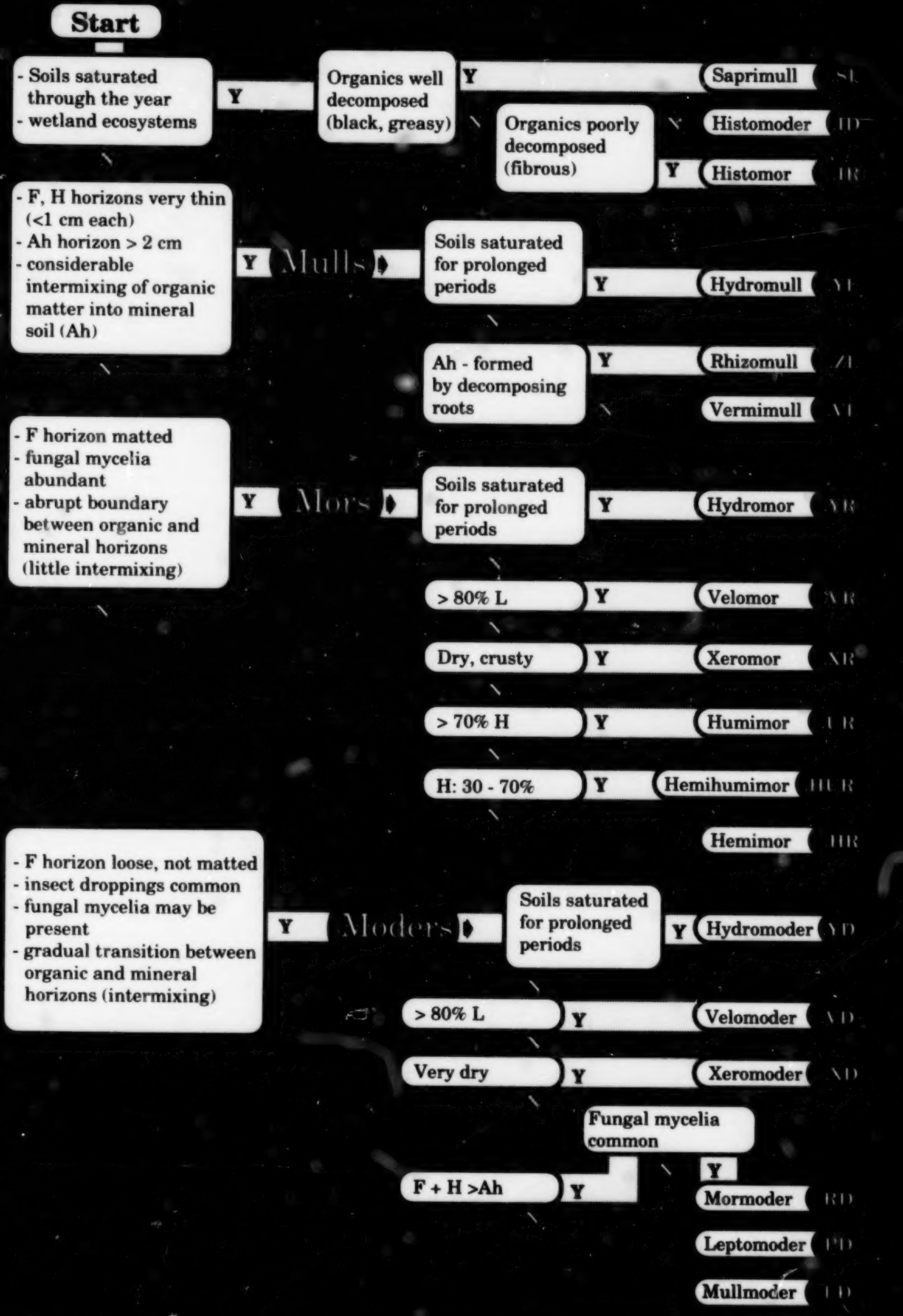
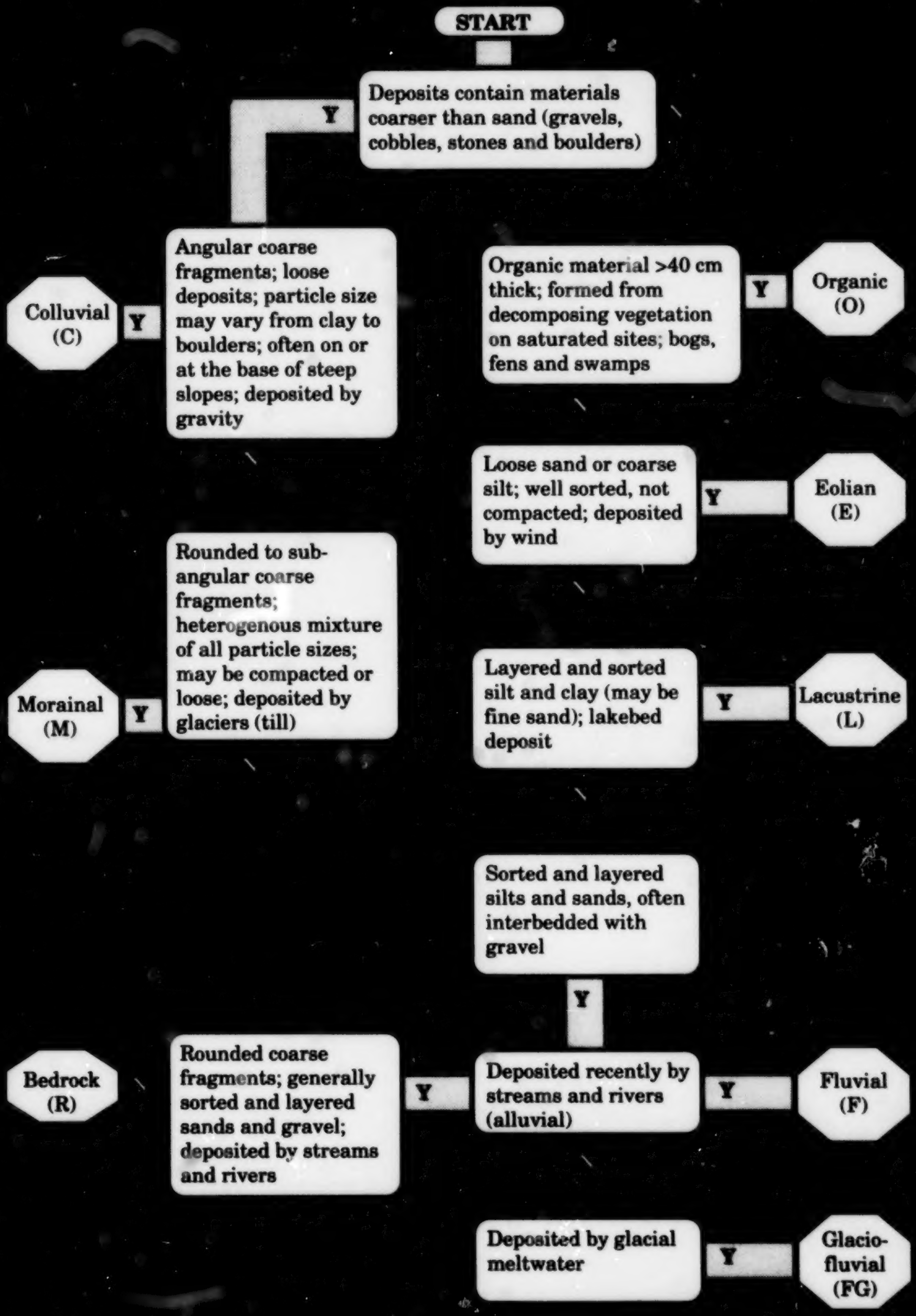
[1] After Klinka *et al.* (1981).

A key for identifying humus forms (cont'd)


Start
- Soils saturated through the year
- wetland ecosystems
Y
N
Organics well decomposed (black, greasy)
Y
Saprimull
SL
N
Organics poorly decomposed (fibrous)
N
Histomoder
HD
Y
Histomor
HR
- F, H horizons very thin (<1 cm each)
- Ah horizon > 2 cm
- considerable intermixing of organic matter into mineral soil (Ah)
Y
Mulls
Soils saturated for prolonged periods
Y
Hydromull
YL
N
Ah - formed by decomposing roots
Y
Rhizomull
ZL
N
Vermimull
VL
N
- F horizon matted
- fungal mycelia abundant
- abrupt boundary between organic and mineral horizons (little intermixing)
Y
Mors
Soils saturated for prolonged periods
Y
Hydromor
YR
N
> 80% L
Y
Velomor
VR
N
Dry, crusty
Y
Xeromor
XR
N
> 70% H
Y
Humimor
UR
N
H: 30 - 70%
Y
Hemihumimor
HUR
N
Hemimor
HR
N
- F horizon loose, not matted
- insect droppings common
- fungal mycelia may be present
- gradual transition between organic and mineral horizons (intermixing)
Y
Moders
Soils saturated for prolonged periods
Y
Hydromoder
YD
N
> 80% L
Y
Velomoder
VD
N
Very dry
Y
Xeromoder
XD
N
F + H >Ah
Y
Fungal mycelia common
Y
Mormoder
RD
N
Leptomoder
PD
N
Mullmoder
LD

Appendix 8 — A generalized key for identifying parent materials in the Kamloops Forest Region



Deposits contain materials coarser than sand (gravels, cobbles, stones and boulders)

Angular coarse fragments; loose deposits; particle size may vary from clay to boulders; often on or at the base of steep slopes; deposited by gravity

Organic material >40 cm thick; formed from decomposing vegetation on saturated sites; bogs, fens and swamps

Loose sand or coarse silt; well sorted, not compacted; deposited by wind

Rounded to sub-angular coarse fragments; heterogenous mixture of all particle sizes; may be compacted or loose; deposited by glaciers (till)

Layered and sorted silt and clay (may be fine sand); lakebed deposit

Sorted and layered silts and sands, often interbedded with gravel

Rounded coarse fragments; generally sorted and layered sands and gravel; deposited by streams and rivers

Deposited recently by streams and rivers (alluvial)

Deposited by glacial meltwater

A generalized key for identifying parent materials in the Kamloops Forest Region (cont'd)[1]

Surface expression subscripts are added to the parent material symbol. The surface expression of parent materials is their form (assemblage of slopes) and pattern of forms. Sub-scripts used in this field guide are:

Term	Definition
b	blanket: a mantle of material ≥ 1 m thick.
v	veneer: material < 1 m thick.
t	terrace: steep sloping scarp face and the horizontal (or gently sloping) surface behind it.
f	fan: a fan-shaped form, with a gentle gradient from apex to toe.

Landform Description

The combination of parent material and surface expression symbols indicate the landform. Landform expressions may be used alone or in combination, (e.g., Mb, Mv/R, Cv/Mb).

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[1] For more information consult Howes and Kenk (1988).

Appendix 9 — Assessment of soil moisture and nutrient regimes

Soil moisture regime refers to the soil's ability to supply available water for plant growth. Soil nutrient regime is an indication of the soil's ability to supply the essential nutrients required for plant growth. Tables are presented to assist in the identification of soil moisture and nutrient regimes. Important site factors are listed in the left-hand column of each table. These factors are easily determined in the field.

All site factors are defined and can be determined by using the identification tools presented in this guide. Mesoslope positions are illustrated in Figure 6 and defined in Appendix 10. Methods for determining soil texture and coarse fragment content are outlined in Appendix 5. Soil depth and gleying are defined in Appendix 10. A key to humus forms is presented in Appendix 7. A key for identifying bedrock type can be found in Appendix 11.

Site factors are divided into commonly used classes such as the soil texture classes sand (S), loam (L) and clay loam (CL). Each factor has been assigned a numerical value. The range in numerical values reflects the site factor's relative importance or contribution to the particular soil regime. The centre of each table contains factors that have an intermediate influence on moisture and nutrient regime. They have been assigned a value of zero. Those factors on the right-hand side have a positive influence while those on the left have a negative influence.

Make a site assessment by evaluating all site factors listed in each table, assign them a numerical value, and note it in the right-hand column of the table. Total the numerical value and compare it with the predetermined class ranges for each moisture or nutrient regime class. All site factors displayed on the table must be evaluated.

All site factors interact in the assessment process. One factor may override or compensate for another. Site features on the left side of the table may compensate for those on the right. For example, sandy-textured soils may be compensated by the presence of a water table in the moisture regime table, resulting in intermediate conditions.

Two tables are presented for assessment of soil nutrient regime. Non-saturated soils occur on upland sites; saturated soils occur in swamps, bogs and fens with prolonged or permanent saturation.

Assessment of Soil Moisture Regime

Site factors	Factors that reduce available moisture ●			Intermediate moisture ●	Factors that increase available moisture ●			Site assessment*
Mesoslope position	Crest ●	Upper ●		Middle & Level ●	Lower ●	Toe ●	Depression ●	___
Slope gradient		>60% ●	35-60% ●	5-35% ●	0-5% ●			___
Aspect: Gentle slopes ≤35%		S, SW ●	W, NW ●	E, SE ●	N, NE ●			___
Aspect: Steep slopes >35%		SW ● W, S ●	SE, NW ●	E ●		N, NE ●		
Soil texture	S ●	LS ●	SL ●	SiL, L ●	Si,SCL,CL,SiCL ●	SC,SiC,C ●	Organic ●	___
Coarse fragment content	>85% ●	65-85% ●	35-65% ●	10-35% ●	0-10% ●			___
Soil depth (cm) - for soils lacking a water table or gleyed horizon.	0-25 ●	25-50 ●	50-100 ●	>100 ●				___
Depth to water or gleying (cm)				Absent ●	100-150 ● 75-100 ●	50-75 ● 25-50 ●	<25 ●	___
								Total ___

*** Totalling the values for each site factor gives an estimate of soil moisture regime.**

Soil moisture regime classes and code	Very xeric 0	Xeric 1	Subxeric 2	Submesic 3	Mesic 4	Subhygric 5	Hygric 6	Subhydric 7
Class ranges	●	●	●	●	●	●	●	●

Soil Nutrient Regime Assessment For Non-Saturated Sites

Site factors		Factors that reduce nutrient status –				Intermediate nutrient regime 0	Factors that increase nutrient status +			Site assessment*
Mineral soil rooting depth (cm)		<10 ●	10-20 ●	20-35 ●	35-50 ●	>50 ●				___
Soil texture			S ●	LS ●	SL ●	SiL, L, Si ●	SCL,CL,SiCL ●	SC,SiC,C ●	Organic ●	___
Coarse fragment content		>85% ●		65-85% ●	35-65% ●	10-35% ●	0-10% ●			___
Humus form		— MORS — <2cm thick or mainly 'L' ●		Others ●		MODERS ●		— MULLS — Ah<5cm ●	Ah>5cm ●	___
Seepage water						Absent ●	Temporary ●	Continuous ●		___
Coarse fragment geology**	Colour		Light ●			Medium ●	Dark ●			___
	Crystal size			Coarse ●		Medium ●	Fine ●			___
	Hardness				Hard ●	Medium ●	Soft ●			___
										Total___

- * **Totalling the values for each site factor gives an estimate of soil nutrient regime.**
- ** **For sites with a mixed geologic composition, estimate the mean. Calcareous rock types should be rated +6. Those able to identify geologic rock types may choose to use the rating class outlined in the table, Soil Nutrient Regime Assessment for Saturated Soils, *instead* of colour, crystal size and hardness.**

Nutrient regime classes and code	Very poor A	Poor B	Medium C	Rich D	Very rich E
Class ranges	●	●	●	●	●

Soil Nutrient Regime Assessment For Saturated Soils

Site factors	Factors that reduce nutrient status −			Intermediate nutrient status 0	Factors that increase nutrient status +			Site assessment*
Geologic source of seepage**	Granite Quartzite [illegible]	Gneiss Granodiorite Rhyolite [illegible]	Sandstone Quartz-Diorite [illegible]	Conglomerate Breccia [illegible]	Gabbro Schist Slate [illegible]	Basalt Shale Mudstone [illegible]	Ultramafics Limestone Marble [illegible]	___
Humus Form	Histomor [illegible]		Hydromor Histomoder [illegible]	Hydromoder [illegible]	Hydromull [illegible]		Saprimull [illegible]	___
								Total ___

* Totalling the values determined for each site factor gives an estimate of soil nutrient regime.
** A key to the identification of common rocks of the Kamloops Forest Region is presented in Appendix 10.

Nutrient regime classes and code	Very poor A	Poor B	Medium C	Rich D	Very rich E
Class ranges	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Appendix 10 — A key to the identification of soil moisture regimes[1]

This key is to assist the user in identifying soil moisture regime using readily observable environmental features. It should be applied with caution on steep south slopes of drier subzones. In such cases, the soil moisture regime class may be one class drier. The soil moisture regime classes, 0–7, shown in the key correspond to the terms very xeric (0) to subhydric (7).[2]

Category	Definition
Ridge crest	height of land; usually convex slope shape.
Upper slope	the generally convex-shaped, upper portion of a slope.
Middle slope	the portion of a slope between the upper and lower slopes; the slope shape is usually straight.
Lower slope	the area towards the base of a slope; the slope shape is usually concave. It includes toe slopes which are generally level areas located directly below and adjacent to the lower slope.
Flat	any level area (excluding toe slopes); the surface shape is generally horizontal with no significant aspect.
Alluvium	post-glacial, active floodplain deposits along rivers and streams in valley bottoms; usually a series of low benches and channels.
Depression	any area that is concave in all directions; usually at the foot of a slope or in flat topography.
Soil depth	depth from the mineral soil surface to a restricting layer such as bedrock, strongly compacted, or strongly cemented materials (e.g. "hardpan").
Gleyed	soils that have orange coloured mottles indicative of a fluctuating water table. Permanently gleyed soils are dull yellowish, blue or olive in colour.
Soil particle size coarse	sandy[3] with >35% volume of coarse fragments or loamy[3] with >70% volume of coarse fragments.
Fine texture	silty[3] or clayey[3] with <20% coarse fragment volume.

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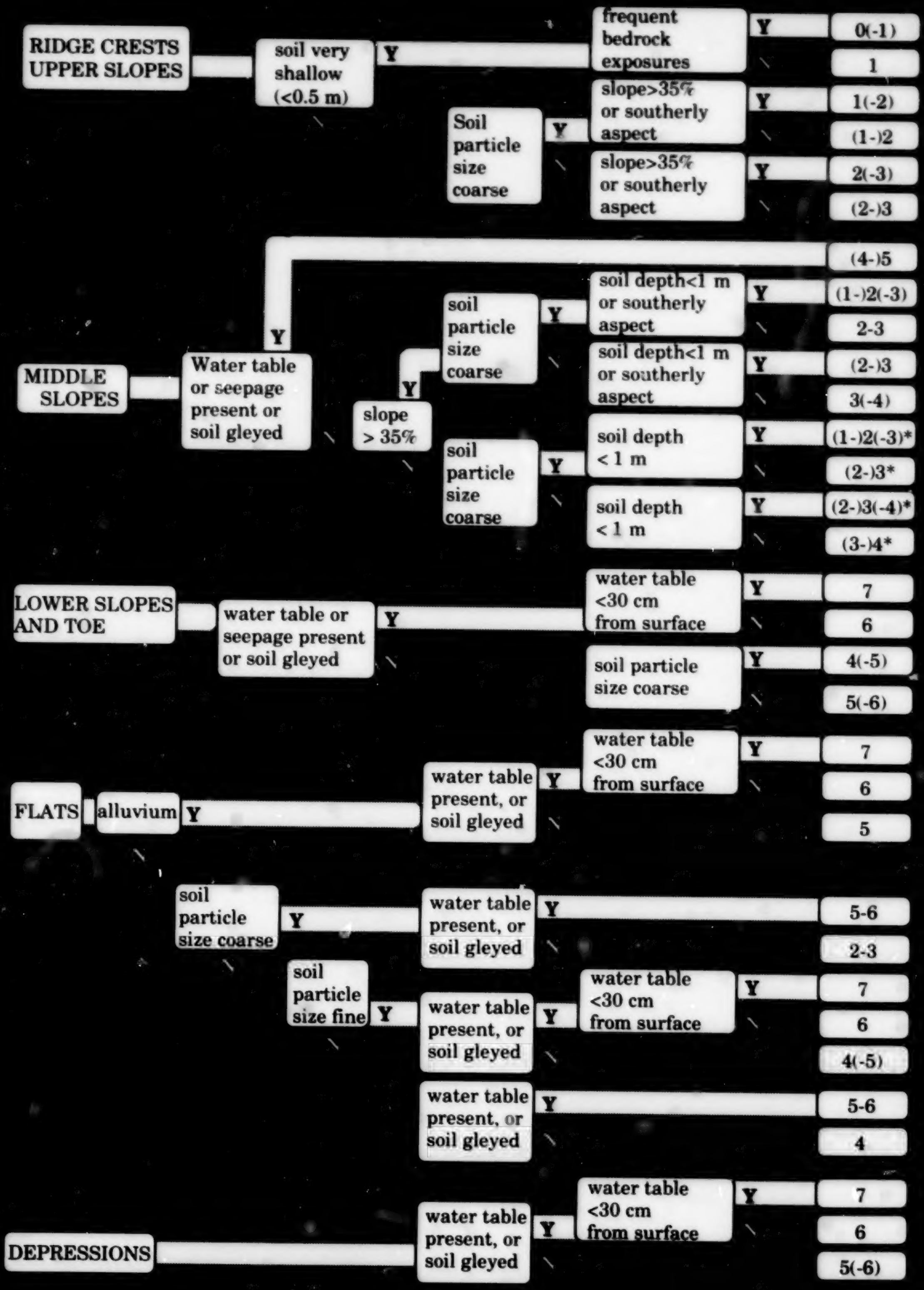
[1] Adapted from Green *et al*. (1984).

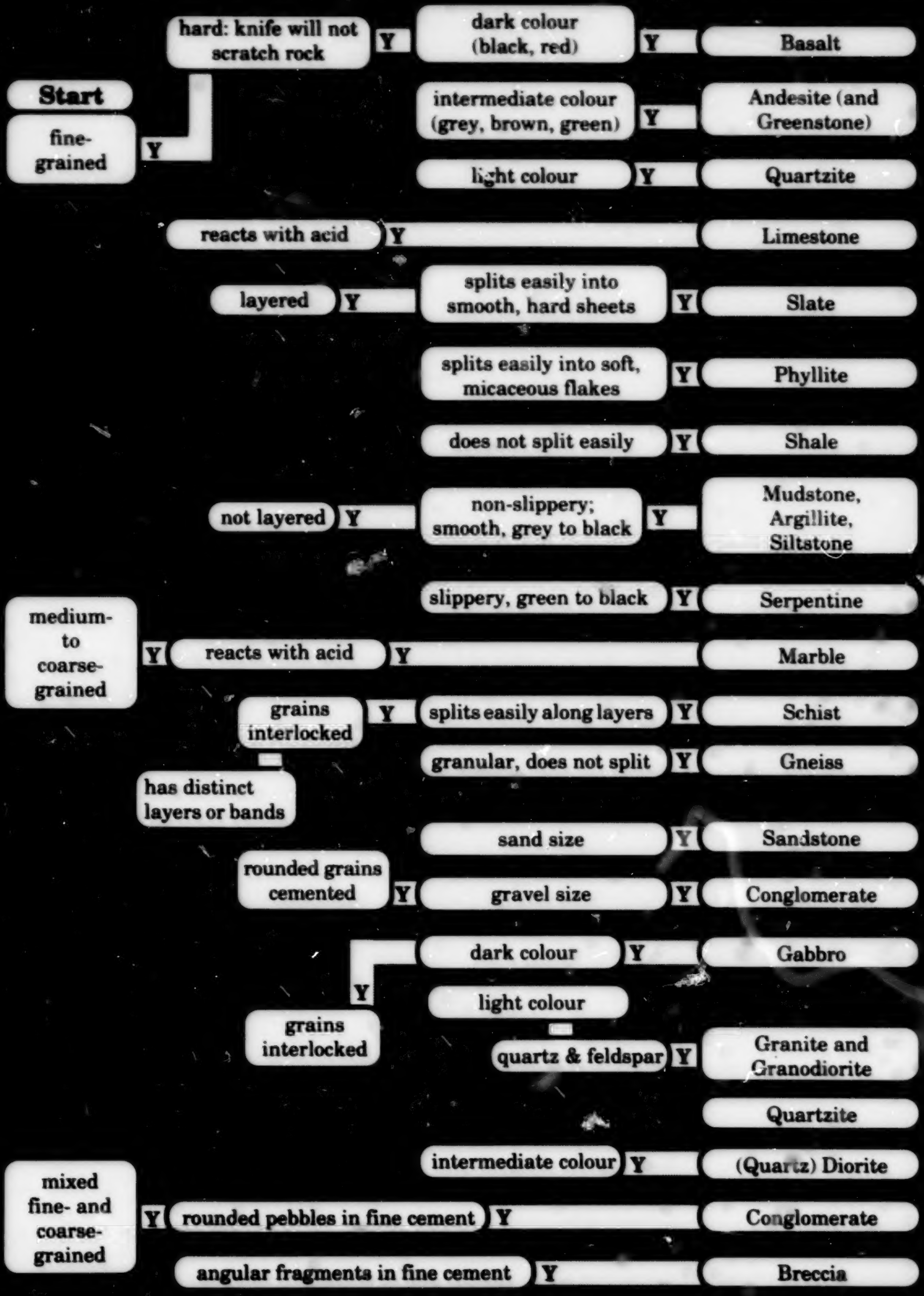
[2] 0 – very xeric, 1 – xeric, 2 – subxeric, 3 – submesic, 4 – mesic, 5 – subhygric, 6 – hygric, 7– subhydric.

[3] Sandy – LS, S; loamy – SL, L, SCL; clayey – SiCL, CL, SC, SiC, C; silty – SiL, Si.

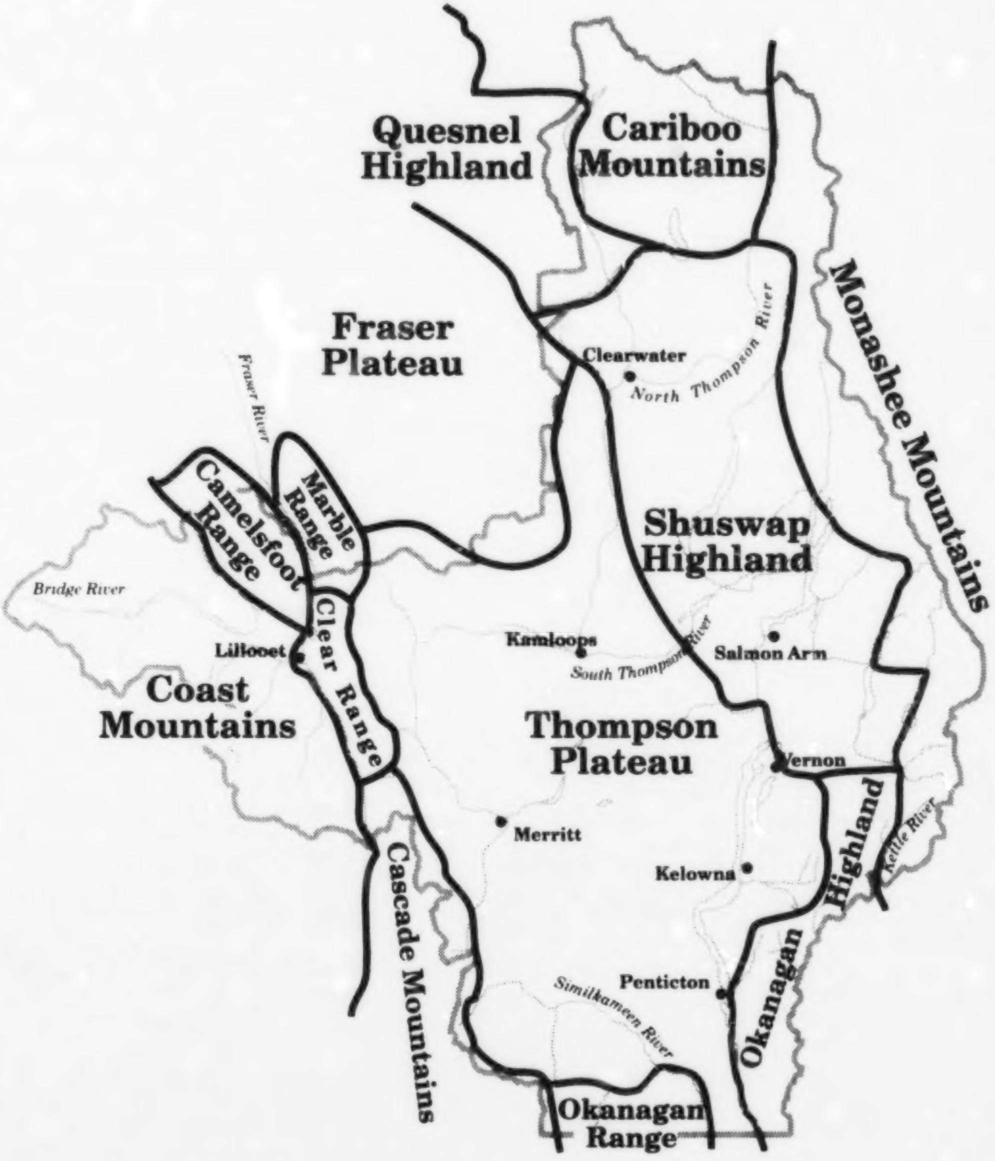
A key to the identification of soil moisture regimes (cont'd)


RIDGE CRESTS UPPER SLOPES
soil very shallow (<0.5 m)
Y
frequent bedrock exposures
Y
0(-1)
1
Soil particle size coarse
Y
slope>35% or southerly aspect
Y
1(-2)
(1-)2
slope>35% or southerly aspect
Y
2(-3)
(2-)3
MIDDLE SLOPES
Water table or seepage present or soil gleyed
Y
(4-)5
slope > 35%
Y
soil particle size coarse
Y
soil depth<1 m or southerly aspect
Y
(1-)2(-3)
2-3
soil depth<1 m or southerly aspect
Y
(2-)3
3(-4)
soil particle size coarse
Y
soil depth < 1 m
Y
(1-)2(-3)*
(2-)3*
soil depth < 1 m
Y
(2-)3(-4)*
(3-)4*
LOWER SLOPES AND TOE
water table or seepage present or soil gleyed
Y
water table <30 cm from surface
Y
7
6
soil particle size coarse
Y
4(-5)
5(-6)
FLATS
alluvium
Y
water table present, or soil gleyed
Y
water table <30 cm from surface
Y
7
6
5
soil particle size coarse
Y
water table present, or soil gleyed
Y
5-6
2-3
soil particle size fine
Y
water table present, or soil gleyed
Y
water table <30 cm from surface
Y
7
6
4(-5)
water table present, or soil gleyed
Y
5-6
4
DEPRESSIONS
water table present, or soil gleyed
Y
water table <30 cm from surface
Y
7
6
5(-6)

Appendix II — Key to the identification of common rocks of the Kamloops Forest Region



Appendix 12 — Physiographic areas of the Kamloops Forest Region[1]



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[1] After Holland (1976).

Request for Revisions

It is anticipated that additions and revisions will be made to this publication once the provincial correlation program is complete and additional sampling has been carried out in the Kamloops Forest Region. To ensure that you receive copies of these changes, please write your name and address below and mail this form to:

Regional Research Ecologist
B. C. Ministry of Forests
515 Columbia Street
Kamloops, B.C. V2C 2T7

Please send copies of additions or revisions to “A Guide to Site Identification and Interpretation for the Kamloops Forest Region” to:

Name: ______________________________
Address: ______________________________
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Comments

Your comments on this publication would be appreciated. Please write your comments, criticisms and suggestions below and overleaf, and mail this form to the above address.